# Products Finishing

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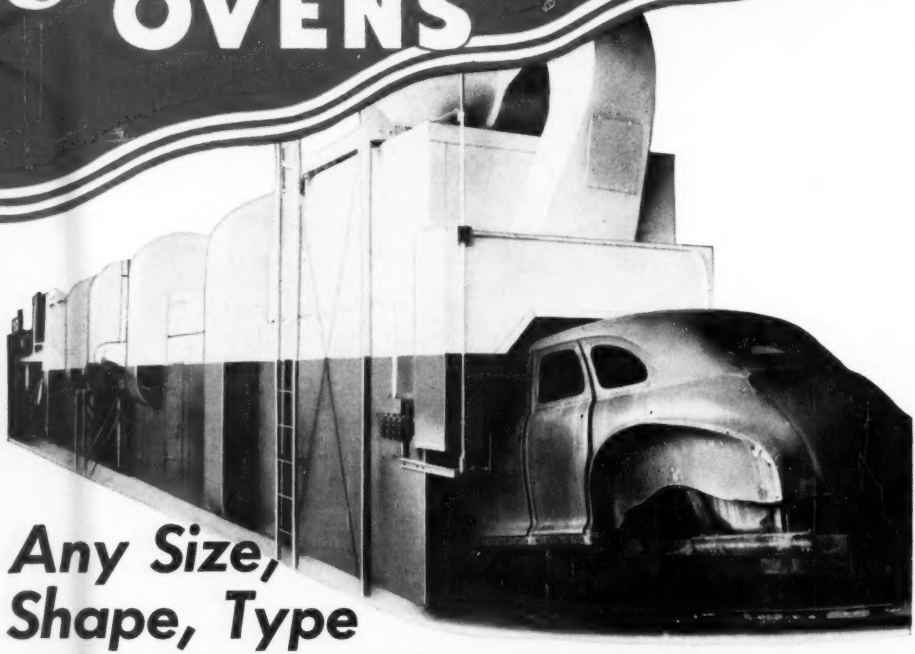

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**See Page 3**

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**What's the best way to strip large areas of structural metal where a steam supply is available?** *See page 5.*

What is the best method when steam is not available? *See page 7.*

**What is the cheapest way to strip metal parts in large volume?** *See page 9.*

What are the best ways to prepare stripped surfaces for repainting? *See page 11.*

**What strippers are best for removing oil-base paints? . . . Synthetic enamels, alkali-resistant plastics or resin-based paints? . . . Japans, wrinkle finishes, nitrocellulose lacquers, alkyds, phenolics and ureas?** *See page 12.*

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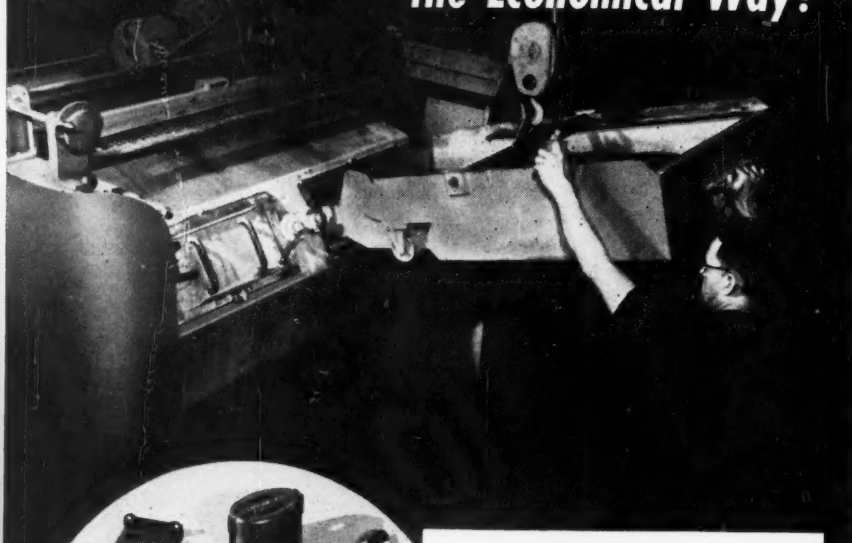

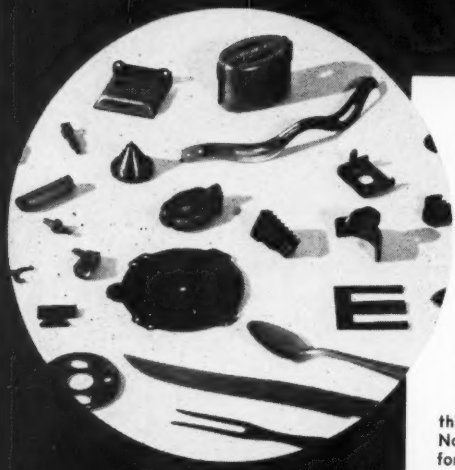

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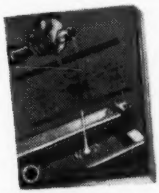

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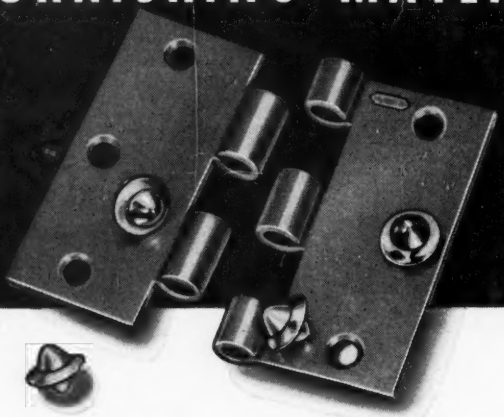

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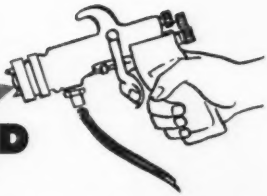

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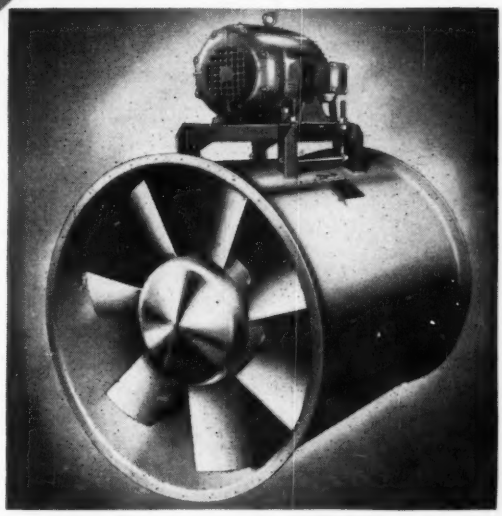

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Pf editorial

Vol. 15, No. 1

OCTOBER, 1950

# Black Finishes

Two results of the present international situation point to the possibility of renewed interest on the part of finishers in the various processes employed to form black coatings on various metals. As increasing quantities of the metals normally used for electroplating are removed from the market under the stockpiling program of our National Defense Establishment, other finishes or combinations of finishes must be substituted as protective and decorative coatings on various products, so that the individual finisher can continue in business. Platers, generally, have already felt a noticeable "pinch," as usual in cadmium and nickel, and are fully aware of the situation.

Further, as contracts for equipment needed by the various military services are let in increasing numbers, more and more finishers will have to acquaint themselves with characteristics of, and application methods for the many black finishes currently available. Such finishes, to meet the needs of the various services, must be capable of application to practically any metal or alloy, including stainless steel, must have as much corrosion resistance as possible, and must not change appreciably the dimensions of the part to which applied. Such specifications cannot always be met on each specific item, but they furnish some idea of the characteristics of the ideal black finish for many military uses.

Such black finish specifications are not easily complied with, but at least they provide finishers and finish technologists with a target at which to direct their efforts.

Ezra A. Blount

# Conveyorized Setup

**Well equipped department handles large volume of products in steel, cast iron, and proportion receive synthetic**

By HERBERT CHASE

HERBERT CHASE, a consulting mechanical engineer, is an experienced author on finishing, metal working and design subjects since he has been writing thereon for more than 30 years. Following his graduation from Sibley College of Mechanical Engineering, Cornell University in 1908, he became laboratory engineer and then chief engineer of the Automobile Club of America.

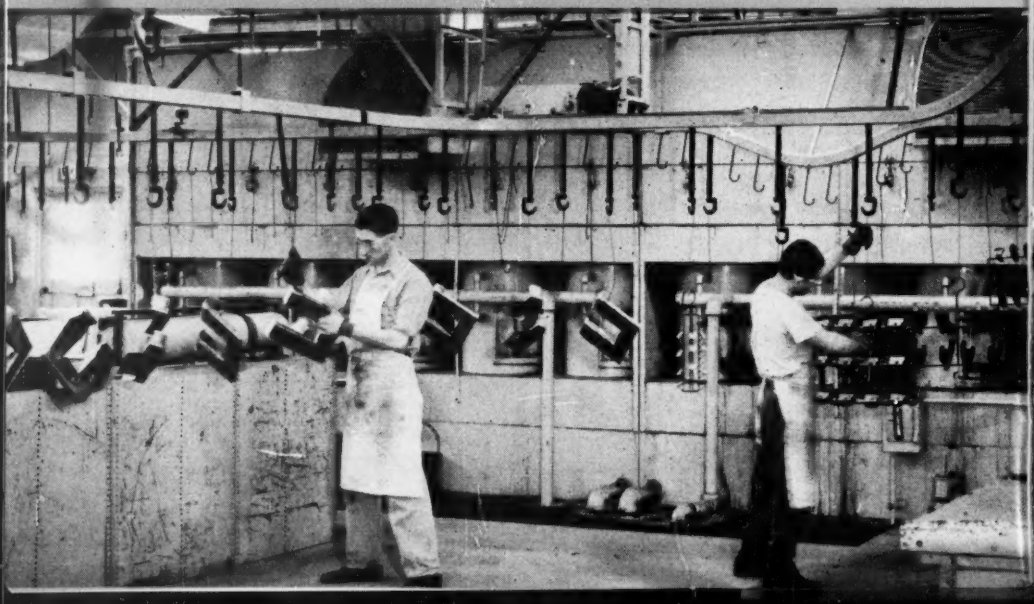
Later, Mr. Chase became assistant secretary of the Society of Automotive Engineers, of which he has been a member since 1910, and had charge of its Washington office doing much work in cooperation with various government departments during World War I.

A former engineering editor of Automotive Industries, Mr. Chase has served on the editorial staffs of several leading industrial publications and has also written, as a free lance, for scores of prominent American and foreign publications of the same type.

Mr. Chase is the author of "Handbook on Designing for Quantity Production" and of books on die castings, one of which includes a chapter on finishes and finishing procedures.

ANYONE familiar with modern practice in finishing metal products would be impressed with the setup recently put into operation at the new Poughkeepsie, N. Y. plant of International Business Machines Corporation. A separate wing of this plant is devoted to application of organic finishes on a large volume basis and no pains have been spared to enable this department to handle its work efficiently or to apply finishes capable of meeting exacting specifications and yielding long life.

Products finished include the new model IBM electric typewriter, card sorters, electronic computing machines and several other business machines.



# Expedites IBM Finishing

**die cast zinc and aluminum. All undergo Spray phosphatizing treatment and large primer and wrinkle enamel.**

Some of these machines are manufactured in large quantities and include a multiplicity of parts, some of which are duplicated many times over in individual machines. Although general practice calls for finishing parts before assembly, others, especially frames, housing or covers, are finished after sub-assembly even though this requires masking of some portions (such as plated decorative parts) before spraying.

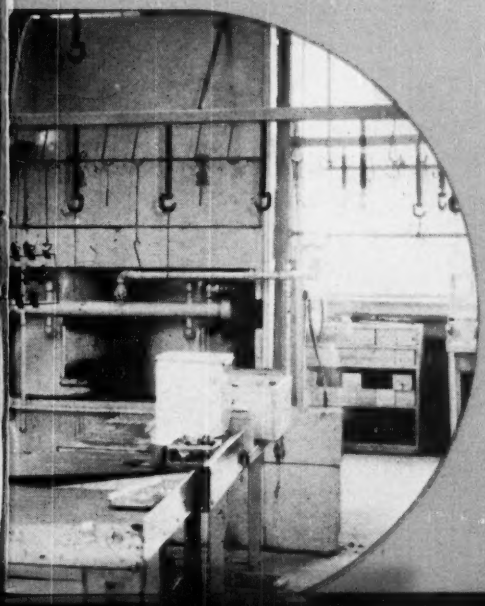
Objectives, of course, include production of enduring finishes at moderate cost. However, appearance factors are fully considered and high quality is insisted upon as essential to customer satisfaction. In view of the variety of parts handled, it is surprising how few types of finish are needed. This result is attained by standardizing as far as possible on a wrinkle finish of fine grain, largely black or gray. Although any color can be supplied on most machines, departure from the established color standards involves higher costs.

Largest in volume of the metals coated is steel, most of which is sheet that is formed and often is in sub-assemblies before delivery to the finishing department. Many iron castings and many aluminum and zinc die castings are also finished. All of these products are benefitted by phosphatizing which not only tends to inhibit corrosion but provides an excellent base and promotes good adhesion of coatings applied.

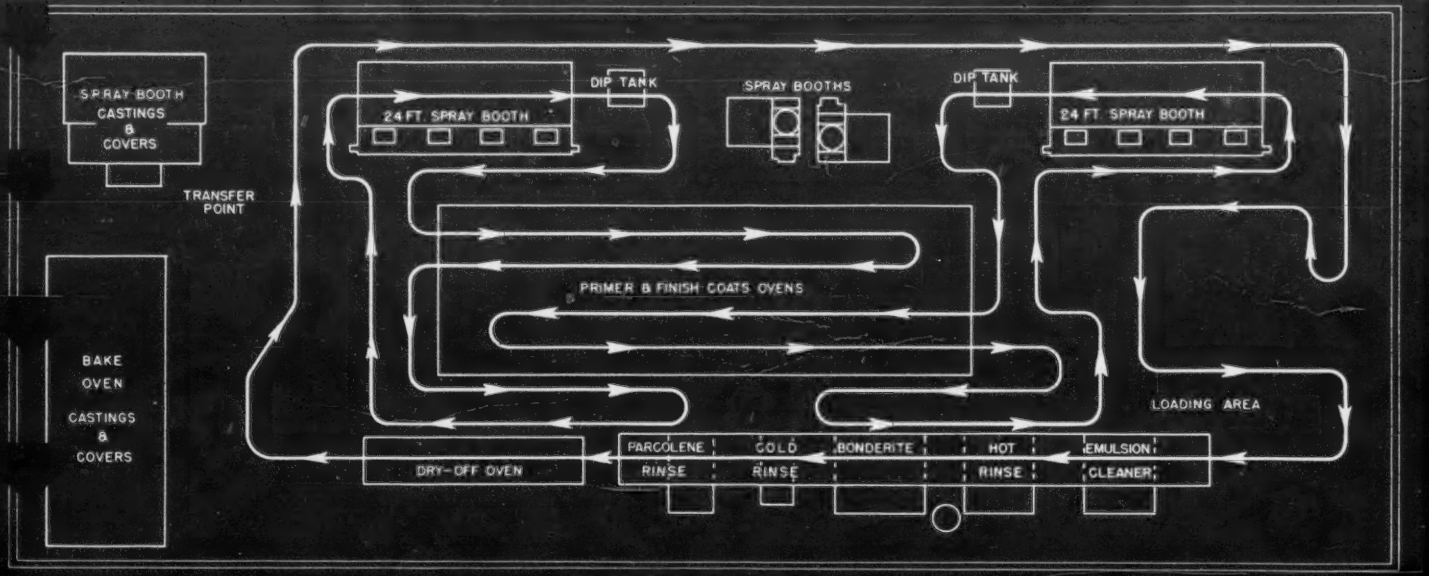
### Process Flow

General arrangement of the organic finishing department is shown in Fig. 1, and is predicated upon the use of overhead monorail conveyors both for the processing operations and for distributing the products to the spray booths, dip tanks and ovens designed for the respective types and sizes of parts. In most cases parts remain on the conveyors, except for momentary shifts, until finished and ready to leave the department in tote boxes or on trays.

The main conveyor travels, at 5 ft./min., a general course around the four sides of the room but with some loops and various dips especially at loading, unloading and transfer points. This conveyor carries parts through the phosphatizing tunnel, and, besides delivering them to spray and oven conveyors and from these conveyors back to unloading points, serves to some extent as a storage conveyor and for cooling parts after baking.



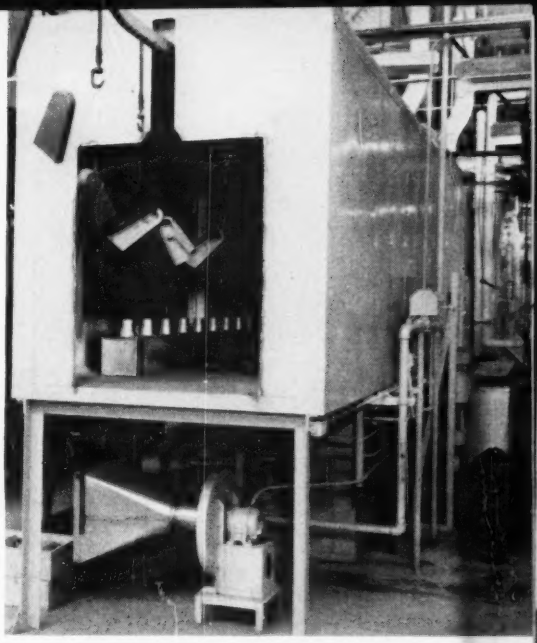
In this area parts received from fabricating departments by fork truck are hung on the main conveyor and go first to the phosphatizing tunnel. After painting and baking, parts return for unloading to tote boxes to be sent to other departments.




IBM PAINT DEPARTMENT LAYOUT

Fig. 1—(left) Layout of the organic finishing department. Overhead monorail conveyors carry work through the phosphatizing tunnel, spray booths, and baking ovens and return it to the loading-unloading area.

Fig. 2—(right) Phosphatizing line, showing work issuing on the conveyor from the drying tunnel at the end of this line. Along the aisle are openings to tanks that supply emulsion cleaner, Bonderite, and Parcolene solutions and rinses.

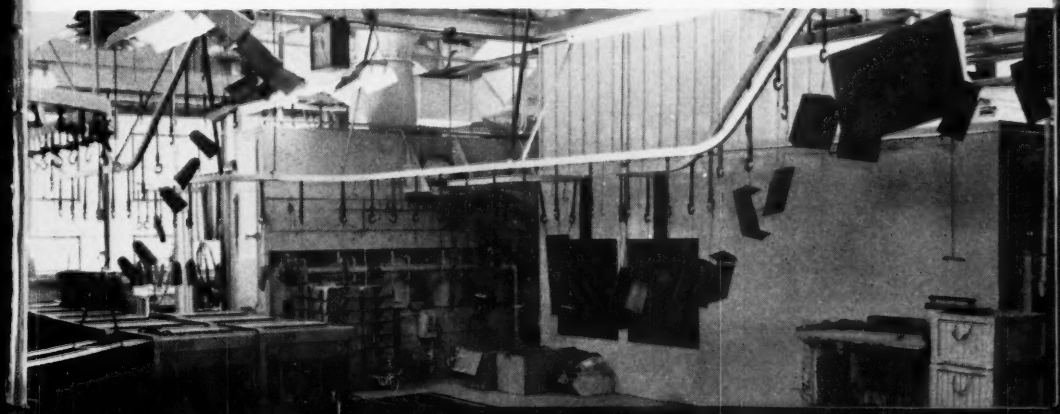


Secondary conveyors serve three large and two small spray booths and carry parts through drying ovens of which three are provided. There are three of these secondary conveyors and each makes a circuit through one of the large spray booths and one oven. At small spray booths and at the dip tank, when one is used, parts are removed from conveyors while being coated and are returned to these conveyors immediately thereafter.

After the main conveyor leaves the phosphatizing tunnel, Fig. 2, and parts cool somewhat, the conveyor dips at a transfer station, Fig. 3. There large parts or assemblies go on a slow (3 ft./min.) conveyor and through the spray booth, Fig. 4, where coating is done. On leaving this booth parts follow a loop, while solvent evaporates, and then enter one baking oven, Fig. 9. Parts issuing from this oven cool and main conveyor at the transfer station, to the primary conveyor.

Many small parts are taken off the main conveyor at the transfer station, Fig. 3, and hung on one of the secondary conveyors that travels at 6 ft./min. through the spray booth, Fig. 5, and then through one of the adjacent ovens, Fig. 6. Parts not removed from the main conveyor at the station, Fig. 3, are taken off at another station,

Fig. 3—Portion of the finishing department that includes the first transfer point from the main conveyor to secondary conveyors that serve two spray booths and two drying ovens, portions of the latter appearing at right.



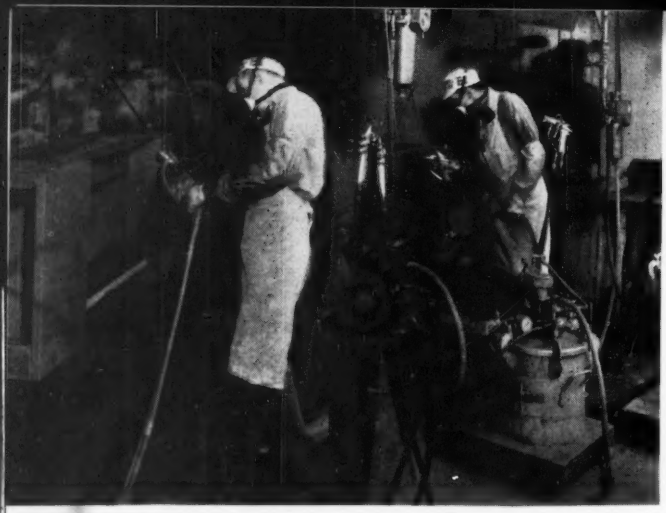


Fig. 4—Spray booth in which large parts and sub-assemblies are coated as they are advanced on a chain conveyor which, after spraying has been completed, carries the work through a drying oven back of the spray booth.

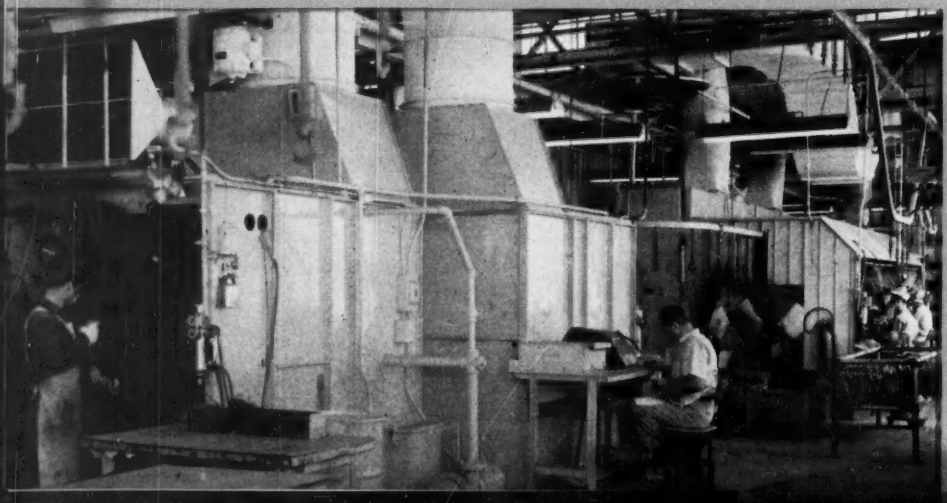
Fig. 7, where they are dipped or sprayed in one of the small booths or are transferred to the third secondary conveyor that serves the third large spray booth and the third oven.

Parts that have received their final coat (many require only one coat) and have been baked and cooled go back onto the main conveyor and are unloaded at the main loading-unloading area, shown on the first page of the article. In this same area, parts are received from fabricating departments by fork truck and, after finishing and unloading from the conveyor, are returned to tote boxes for removal by such trucks. This completes the handling and finishing cycle but the latter includes many factors deserving of mention.

### Finishing Cycle

The first step in the finishing cycle consists of surface preparation of the metal for painting by means of a phos-

Fig. 5—One of the spray booths for small to medium size parts is shown at far right. Parts are advanced through this booth by one of the faster secondary conveyors. At left is one of the small spray booths that is not conveyorized, parts being removed by hand from a conveyor back of the operator.



phatizing process in which the parts being treated are subjected to the chemical action of a series of solutions. The parts remain on the main conveyor during all the various steps of the process and are cleaned and phosphatized by sprays of the various solutions directed on the metal products from all angles at high velocity. Thus, all surfaces are cleaned and covered with a corrosion resistant coating which serves as an excellent paint base.

In the phosphatizing tunnel the first stage involves treatment with a Parker emulsion cleaner solution heated by steam coils to 150-160 deg. F. This cleaner removes oil and grease as well as other foreign matter and is constantly recirculated through a tank that is cleaned out once in two weeks. Parts thus cleaned enter the second stage where they are spray-rinsed in water at 140-150 deg. F. A fresh supply of water is constantly being added and overflowed from the tank under this stage.

Actual phosphatizing takes place in the third stage of the process. The standard Parker Bonderite solution is employed at a temperature closely controlled between 140 and 145 deg. F. by steam coils. This solution is constantly circulated and filtered and its strength is automatically held constant by additions of new solution at the required rate. Since this solution acts also on the steam coils submerged therein, these are removed and cleaned once in three months by boiling 2 to 3 hours in a 20 per cent caustic soda solution containing Rochelle salts.

In the fourth stage a water rinse at 80-120 deg. F. is applied, and in the fifth stage the Bonderized surface is sprayed with No. 1 Parcolene at 150-160 deg. F., this being a mild chromic acid solution. Although this completes the phosphatizing cycle, the parts continue at the rate of 5 ft./min. through a 24-ft. drying tunnel the end of which can be seen in Fig. 2. This tunnel is gas-fired to a temperature of 425 deg.

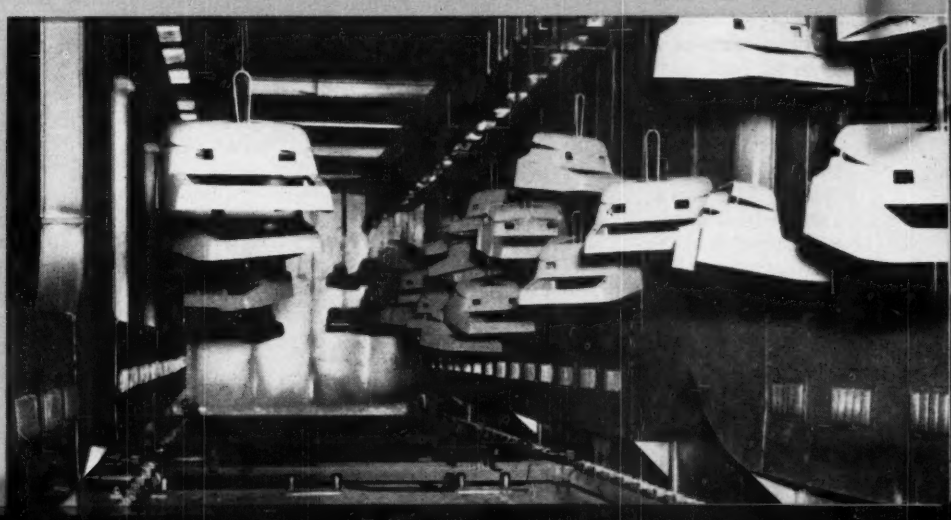


**Fig. 6—Looking into baking ovens which are heated by rows of gas burners at floor level. Exhaust ducts are along side walls as well as along the roof. Work is advanced by chain conveyor at 6 ft./minute.**

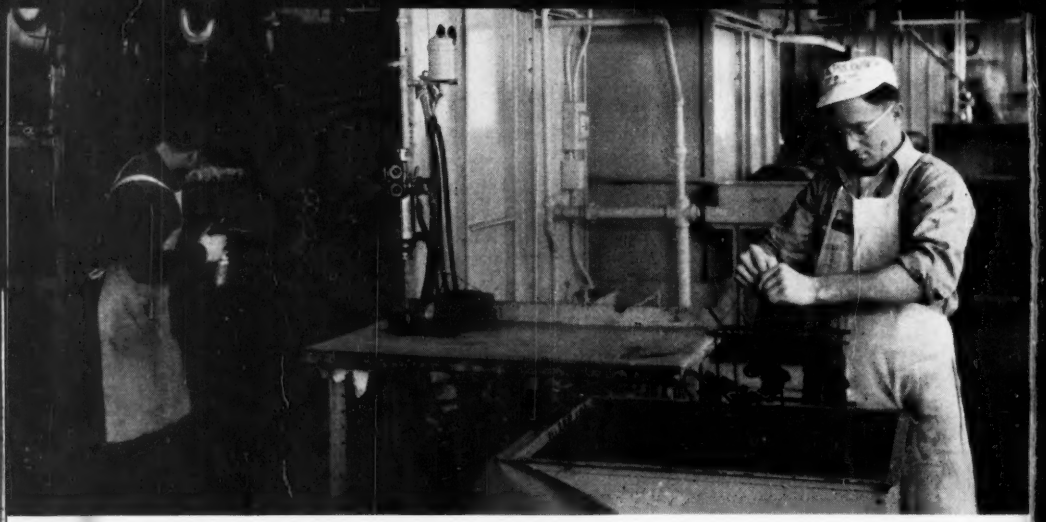


Fig. 7—Area in which some parts are dip coated and others receive spray coatings in small booths after removal from conveyors. Still other parts are transferred in this area to a secondary conveyor serving one large spray booth.

F. and has forced convection around the parts, which issue with all moisture evaporated and continue while cooling toward the transfer station, Fig. 3.

Air forced into the finishing room is filtered and (when required) is heated on its way to many outlets in overhead ducts that distribute the fresh air to all parts of the room. All paint booths and ovens, of course, have their own exhaust systems and other exhaust outlets are also provided; hence there is an ample supply of clean, fresh air throughout the room.

Spray booths are of the Newcomb type and all have water curtains on back walls. Exhaust is made through stacks into which water sprays, and exhaust inlets are just above troughs some 15 inches above floor level. Hence, overspray and fumes travel generally downward and away from operators, who work with backs toward windows. All booths have excellent fluorescent lighting.

Finishes are fed from individual castered tanks at 8 to 12 p.s.i. fluid pressure, and sprayed at 79-80 p.s.i. air pressure. All finishes are supplied ready mixed in suppliers' pails from a store room in one corner at the end of the spray booth aisle. One man in charge of this room moves the containers by hand to keep all spray tanks at required levels. Benches along the aisle have small solvent holders in which spray operators keep guns clean.

There is a separate supply tank for each material and all operators have two guns used either for primer and enamel or for two colors of enamel, depending upon requirements of parts in process. Hooks for guns not in use are provided, of course, and guns are always ready as parts pass through the booth on the conveyor. Two or more sprayers operate in all the conveyorized booths.

Although some parts, including some small ones handled on racks, are dipped rather than sprayed, the proportion is small; hence all dipping is done by hand. The tank is placed under one of the secondary conveyors feeding toward the baking oven and passes over a drip frame. Parts for dipping are taken from the main con-

veyor where it makes its second dip, Fig. 7. Some of the parts dipped are castings that are still not machined. Some of these are returned after machining for a second coating.

Some parts have machined or other surfaces that must be kept free from organic finishes when other surfaces are being coated. This requires masking which is done with tape, paper, metal masks (some of which are fixed permanently to spray frames holding several parts) or a special material called Masq-it which is applied by brush. This brushed-on impervious film does not dry in baking and is quite easily stripped, after lifting a corner with a knife, when spraying and baking have been done.

All three bake ovens are gas-fired. The Burdett individual burners installed along the floor attain a red heat and emit some infra-red rays that help to promote drying. The principal heating is by forced convection, as there are exhaust ducts in the roofs of the ovens as well as along walls. Baking is commonly done at 300 to 310 deg. F. but the temperature sometimes is raised to 350 deg. F. if the weight of parts going through is high, as when large castings are baked.

Two of the ovens, used entirely for small parts, are set side by side near the center of the finishing room. Conveyor speed commonly is set to give an 18-minute bake, but can be varied if required. The third oven at one end of the room is used only for large parts or assemblies. It has only half the conveyor length of the other ovens but, as the conveyor travels only half as fast, the baking time is usually the same.

Although all large and many small parts are sprayed or dipped individually, many small parts are handled on racks that have been designed to save considerable time in handling even when spraying of each part is actually a separate operation. This applies, of course, to parts that are required in quantities sufficient to warrant the investment in racks, and especially to parts that are made in recurring lots that are fed through finishing at intervals, say each day, each week or each month, as production schedules require.

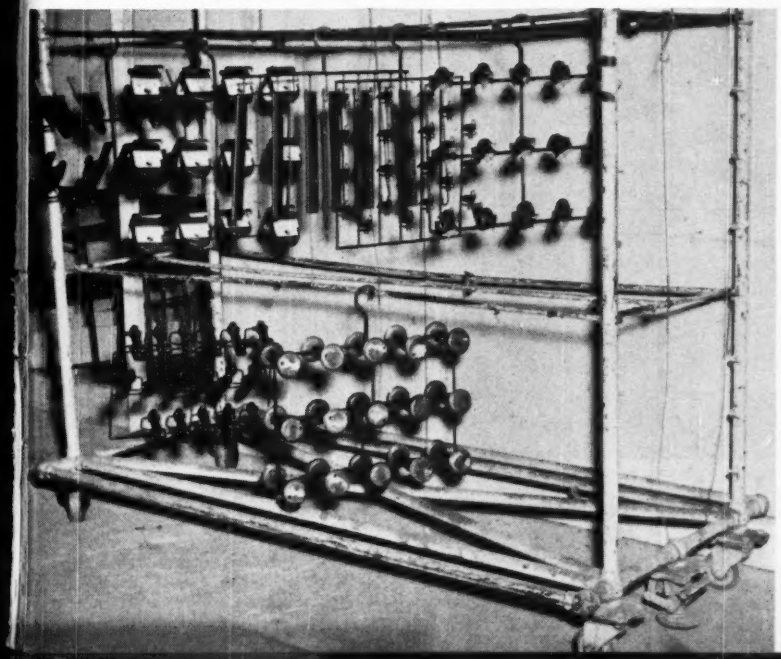


Fig. 8 — A few racks typical of those on which many different small parts are hung for finishing operations. Some racks include supporting plugs that keep paint out of holes and some have plates that mask other surfaces not to be coated.

A few racks typical of those employed are shown in Fig. 8. Each must be so made that all surfaces requiring coating will be exposed and that those not to be coated, if any, are masked. A rack that does masking as well as performing other functions is doubly useful because it saves not only handling time but helps to minimize masking time.

Some racks include plugs that act as stoppers to close holes in which no spray is permitted, and serve also to support the work. Other racks include plates that mask certain areas but leave others exposed. Certain racks include both plugs and plates or masking shields. Racks occupy only one conveyor hook each and increase conveyor capacity in proportion to the number of parts the racks contain. Handling per part is considerably reduced and the use of racks enables such units as the phosphatizing tunnel, spray booths, dip tanks and ovens to operate more nearly at maximum capacity than they could if each part were carried on a separate conveyor hook.

Although synthetic baking primer and synthetic baking enamel of one or another wrinkle type are the finishes most used, some parts take smooth non-wrinkling enamel and some receive more or less "special" finishes, some of which are air dried. Parts that receive decals or that include painted or printed scale graduations have a coat of clear lacquer applied over the surface to prevent abrasion or reduce the chance that the decal or scale will be worn through in service.

Experiments are being made constantly with new or improved organic finishes to meet possible changes in sales requirements, to improve durability, to lower cost without sacrifice in quality, and to gain other advantages. Such experiments help to prevent the chance that real advance-

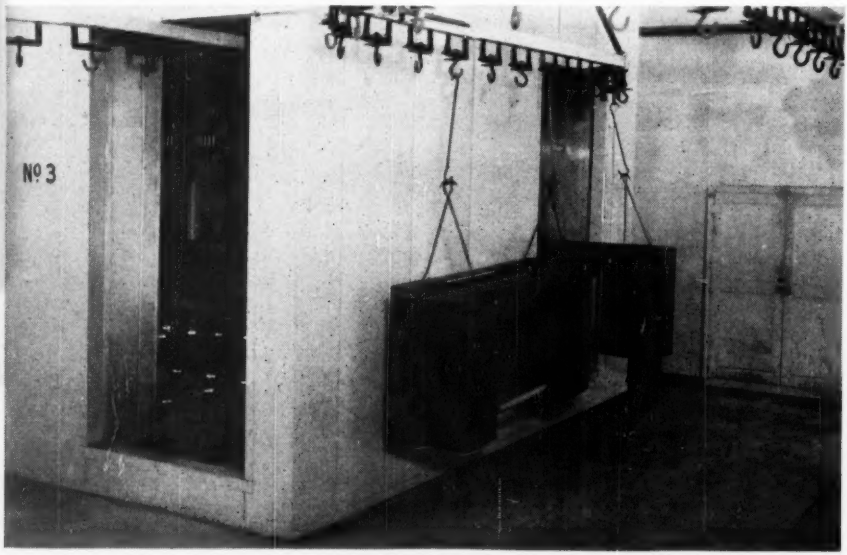
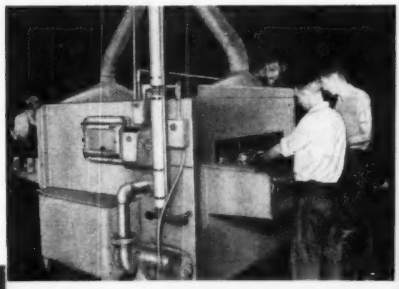



Fig. 9—Large assemblies enter the drying oven after being sprayed in the booth, shown in Fig. 4, and pass along a loop of the slow conveyor while most of the solvent in the enamel evaporates.

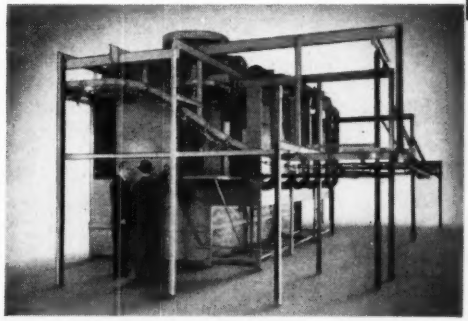
# NO JOB Too Small or Too Large

Alvey-Ferguson has, for many years, provided Washing Machines to fit the varying needs of all types of metal working and other plants. These years of experience back the engineering of each specialized washer built to meet *your* plant's special requirements.

**None Too Small** — For washing metal products of various shapes and small metal parts this "Standard" Model A-F Washing Machine has been designed. It washes thoroughly, economically and efficiently.



The A-F Washer shown at right is being used by a large manufacturer to wash gummy lubricants from stampings, which must be thoroughly cleaned before assembly. *Write for folder—today!*



**None Too Large**—Twenty-seven tons of water are required to fill this huge A-F Cleaning and Drying Machine to operating level. Incorporated in this 14-foot giant are many special design features. A-F Engineers are specialists in all types of "custom - built" equipment. *Write for folder — today!*

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**627 Disney Street** ***Established 1901*** **Cincinnati 9, Ohio**

*Offices or Representatives in Principal Cities—Coast to Coast*

CONVEYING EQUIPMENT

**Alvey-Ferguson**

WASHING MACHINES FOR INDUSTRY

ments will not be overlooked, but extensive changes are avoided until careful tests prove their true worth. At present, a minimum number of finishes that have become "standard" with the company meet requirements and help to promote overall economy. Any far-reaching changes must be fully warranted by compensating gains before being put into effect.

---

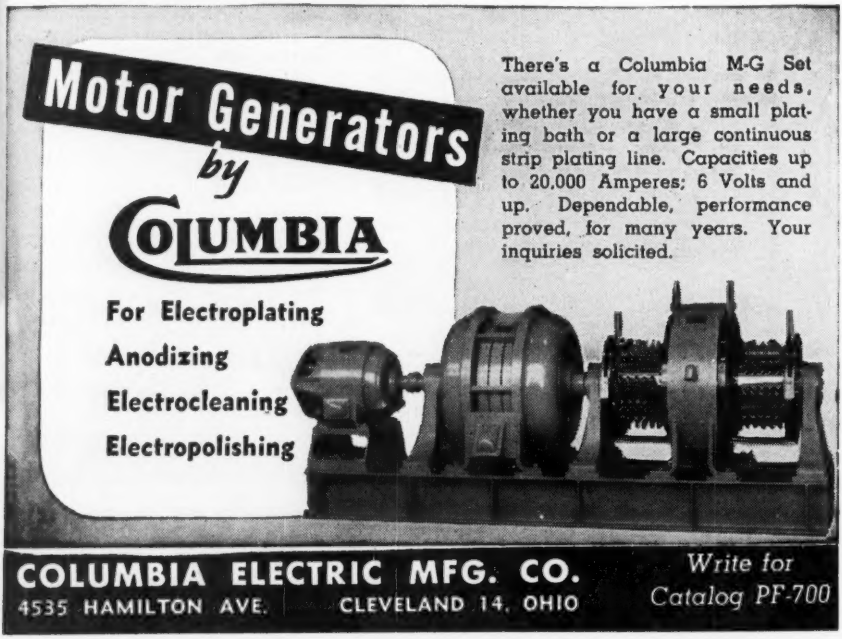
## Uniformly Coated Electrolytic Tin Plate Assured by New Plating Thickness Meter

MORE uniformly coated electrolytic tin plate is being produced through the use of a new instrument developed at the Research Laboratory of Carnegie-Illinois Steel Corporation. This meter, which continuously indicates and records tin coating thickness on steel strip during the plating operation, is now in regular use on all "Ferrostan" electrolytic tinning lines of United States Steel.

The new coating thickness meter operates entirely independently of other control instruments on the lines. Its function is to combine the electrical values of plating current, strip speed, strip width and plating efficiency in a precision circuit employing a self-balancing potentiometer to indicate and record thickness. For the convenience of the operator the instrument is calibrated in pounds per base box.

Formerly, the weight of coating was tested by chemical means from sample sheets selected at intervals from the lines.

Now, when changing from one ordered thickness of coating to another, the operator is not required to read a battery of meters and refer the readings to a chart. Instead, he adjusts the



Motor Generators
by
COLUMBIA
For Electroplating
Anodizing
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There's a Columbia M-G Set available for your needs, whether you have a small plating bath or a large continuous strip plating line. Capacities up to 20,000 Amperes; 6 Volts and up. Dependable, performance proved, for many years. Your inquiries solicited.
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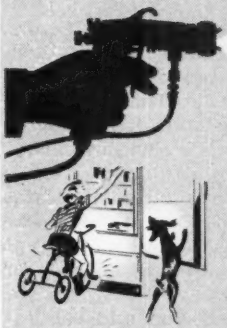
Write for Catalog PF-700

*A GOOD START*

# ...a Stronq Finish!

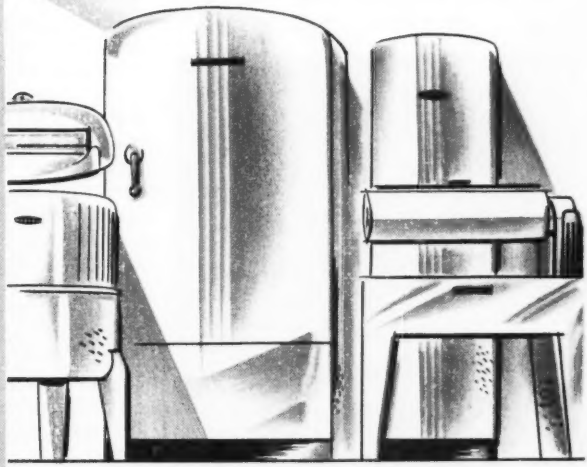


**TOUGH AND MARPROOF**
Kemclad formulations include special ingredients to protect finish against marring, chipping or scratching.

**HOT GREASE? NO HARM DONE!**
Even hot grease won't damage Kemclad's gleaming white finish!

**STAYS WHITE AND STAIN-FREE!**
Kemclad Finishes aren't affected by food acids, weak alkalies, alcohols or other common household chemicals.

**CLEANS EASILY . . . SAFELY!**
Kemclad's smooth surface cleans easily with damp cloth, but withstands strong detergents safely.



Appliance sales often *start* with the *finish.* They often end there, too, unless the finish has the punishment-resisting, white-for-life beauty made possible by the newest synthetic resin finishes!

Kemclad* Appliance Finishes are designed to adapt these qualities to the specific needs of appliance manufacturers. They provide the permanence and protection against abuse expected by today's buyers. Greater hardness and flexibility enable minor defects to be easily rubbed or "dinged" out after baking. Extremely high solid content with low viscosity give better protection at lower cost per finished unit. Write for details. The Sherwin-Williams Co., Industrial Division, Cleveland 1, Ohio. *Trademark

**SHERWIN-WILLIAMS KEMCLAD*** **APPLIANCE FINISHES**

**ANOTHER PRODUCT OF SHERWIN-WILLIAMS INDUSTRIAL RESEARCH**

plating control dials until the plating thickness meter indicates the specific coating weight. Since the instrument provides a continuous indication of coating weight, any variation in plating thickness is indicated at once.

Provision can be made for the instrument to operate an alarm when the coating weight deviates from the specified value. Also, if desired, the equipment may be set readily to control coating weight.

A couple of twists of the wrist and this electrolytic plating turn foreman can be sure his tin plate will have exactly the coating weight specified in his order—and of uniform thickness!
*(Photo courtesy United States Steel Export Co., New York 8, N. Y.)*

Reference potentials which actuate the meter are received from a tachometer generator, whose electrical output is directly proportional to the strip speed, and from a shunt or the equivalent in the plating-current bus, which provides a potential directly proportional to the total plating current. Thus potentials that are always proportional to strip speed and total plating current, respectively, are supplied to the meter continuously.

Since the quantity of tin deposited per unit area on the strip is a function of plating current density, plating time and the efficiency of the plating bath, provisions were made to compensate for variations in these factors. The strip-width compensating potentiometer is calibrated to cover material 18 to 34 inches wide. The strip-width adjusting dial is calibrated in inches and can be set readily within plus or minus $\frac{1}{16}$ inch.

Another potentiometer compensates for plating efficiency variations. Its indicating dial is calibrated in per cent and covers a range of 84 to 100 per cent plating efficiency.

Following installation and calibration of the original plating thickness meter approximately 80 tests were made over a 10-day period of normal operation. These tests covered electrolytic tin plate production ranging from 0.25 to 0.75 pounds per base box. In each test chemical determinations of coating weight were compared with indications on the plating thickness meter. The meter was found to indicate coating weights as accurately as the chemical method.

Use of the meter permits more accurate maintenance of plating conditions, thereby preventing excess plating of certain products and assuring against coating deficiencies in others. Because of its superior control in the "Ferrostan" operation, the use of the meter has been extended to all subsidiaries of United States Steel Corporation producing electrolytic tin plate. Application for patent on the meter has been filed.

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Electroplating of various metals plays an important part in providing us with the efficient telephone equipment of today, according to the American Electroplaters' Society. Figures supplied that body by the manufacturers of telephone equipment show that last year upward of 18,000,000 square feet of electroplating was used on such equipment. Included were applications of gold, silver, zinc, chromium, nickel, copper and tin.

# stop plating rejects caused by incomplete cleaning

my face was covered . . .

with heavy drawing compound and solid dirt. Alkali cleaning proved ineffective. Rejects ran high. Costs doubled.

10 seconds' soak . . .

in Emulsion Cleaner 75 followed by 15 seconds in alkali cleaner eliminates rejects due to faulty cleaning.

## Enthone Emulsion Cleaner-75

1 removes stubborn oil, grease and grime almost instantly

2 insures smoother, brighter, more adherent electrodeposits

3 tapped holes, slots, embossments, corners, crevices, sculptured patterns, emerge completely clean

4 ideal for cleaning work before any phosphate treatment to avoid coarse coatings

Write for literature and operating instructions

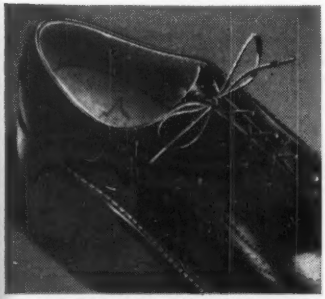
**Enthone inc**

442 Elm Street New Haven Conn

# Don't scold him . . . you can clean these blinds easily

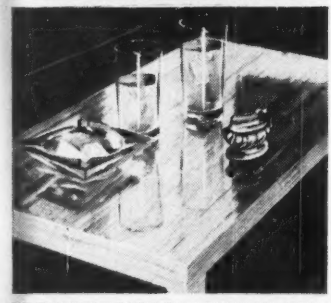
**Problem:** To find a finish for Venetian blinds that could be wiped clean with a damp cloth, erasing hand marks and dirt easily, quickly.

**Solution:** Industrial Finish Engineers developed special finishes that won't hold dirt—won't chip—will prevent rust. These finishes are flexible—can be coated on long continuous strips of metal before strips are cut into slat lengths. This cuts down manufacturing costs tremendously.



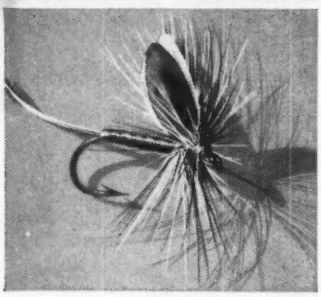
**Problem:** To find a finish for cork inner soles that would resist perspiration and abrasion, add to foot comfort.

**Solution:** Industrial Finish Engineers developed a special finish that is not affected by abrasion or perspiration, actually improves appearance and comfort of inner soles. Sprayed on, it is air-dried in a few minutes —cuts production costs.



**Problem:** To find a finish for furniture that would resist water and other liquids.

**Solution:** Industrial Finish Engineers developed a finish that is impervious to water stains, resists heat and abrasion, alcohol or foods . . . helps build sales.



**Problem:** To find a way to keep fishing flies from sinking below the water surface.

**Solution:** Industrial Finish Engineers developed a special finish that made the feathers on the flies waterproof—kept them floating, made fishermen happy. Manufacturing costs were kept low—the flies sold faster.

*The better the*

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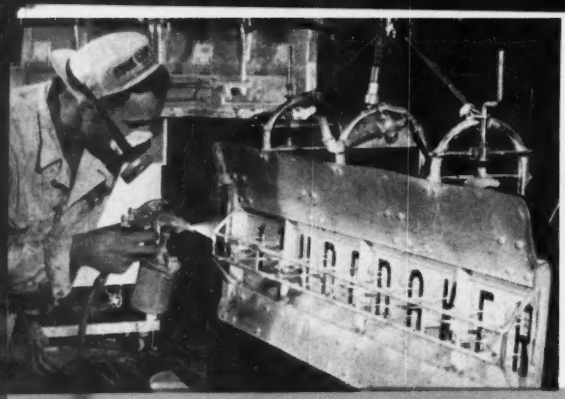
## There is a way you can cut costs— ask any Industrial Finish Engineer!

On this page are case histories of prominent manufacturers which prove that Industrial Finish Engineers actually can cut down production time and costs.

They are doing it for others. They can do it for you. So let an Industrial Finish Engineer make a time study of your production. Let him investigate your finishing cycles. Let him show you how quality Industrial Finishes, properly engineered for your products, can help you save expenses. Consult him today. Most of your customers *start buying with the finish in mind.*

***finish – The better the buy!***

VARNISH AND LACQUER ASSOCIATION, INC., WASHINGTON, D. C.



# MODERN MASKING FOR FABRICATION

## PART III

**Metal Shields and Electroformed Masks**

By ARTHUR P. SCHULZE

**A Special Survey-Report**

The time-saving possibilities in masking operations presented by metal shield or form-fitting templates have attracted considerable attention from production painting departments and job finishing shops alike during and since the war.

Back of this sustained interest lie two factors, chiefly: (1) the demand for shielding products and parts for selective spray color decoration on a consistently uniform and speedy repetitive basis; (2) the necessity of doing the job at minimum unit cost. This latter consideration assumes increased importance to all quality-minded, cost-conscious finishing executives in these days of mounting costs.

As a matter of plain fact, it is this factor, perhaps more than any other, that has hastened, and continues to stimulate, the use of these masking devices,[1],[2] which have demonstrated their ability to effect economies on many different products or parts unattainable with other methods. Automotive trim of all sorts, stampings, hub caps, grilles, die-cast nameplates and emblems; refrigerator hardware, bicycle parts—even some toys and art objects—are but a few of the many items now being masked for multi-color decorative finishing, on a production scale in many plants and shops

**In the protective masking of products and parts for selective spray color decoration, electroformed masks and metal shields can be utilized to meet the requirements of quantity output. The uses, types, and features of these masking devices are reviewed briefly in this article, the third of a series of four surveying masking materials and methods and their industrial utilization.**

Arthur P. Schulze

# MATERIALS AND METHODS AND SPRAY FINISHING

through the use of metal masking stencils or form-fitting masks.

Selective masking by these means depends to a large extent upon the production volume involved. If the quantity is large, running into hundreds or thousands of units, then a metal mask invariably "writes itself off" from a cost standpoint.

To express it another way, a metal mask is like many other production tools or machines in that its cost, amortized over a long production run or used for a sufficiently long period of time, amounts to only a fraction of a cent per production piece. On the other hand, of course, when only a limited number of parts are to be masked, then the investment might not be justified economically.

●

It should also be remembered—and this applies especially to intricate work, such as painting one color right after another on many concave, convex or irregularly shaped three-dimensional parts—that masking by other methods or materials may not prove practical. Or, again, they may prove time-consuming, both in their application and removal.

Shields or templates afford a practical means of masking a part when there is a relative elevation difference

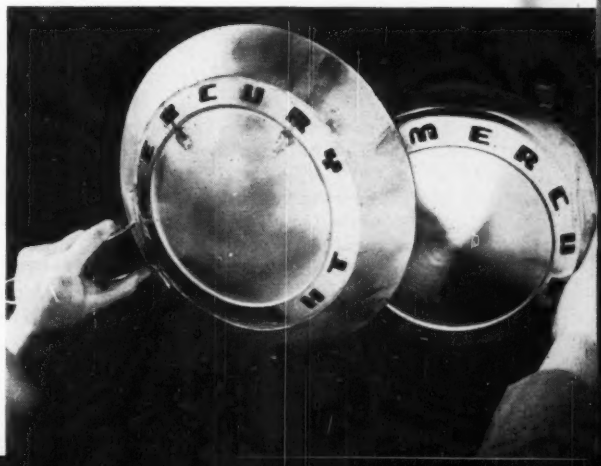


Fig. 1—A Duggan-designed electroformed form-fitting mask used for spray-painting lettering on chrome-plated automobile hub cap. (*Photo courtesy Duggan Masking Devices, Detroit, Mich.*)

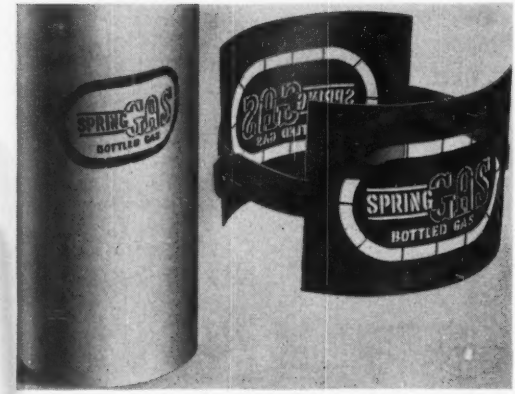



Fig. 2—Gottscho metal spray stencil, a new development for decorating and marking concave, convex or irregularly shaped objects with paint or sand sprays. Custom-made for all types of containers and products, it produces clear, sharp designs without halos or ragged edges.
*(Photo courtesy Adolph Gottscho, Inc., New York, N. Y.)*

between the section to be painted and that which is to be left unpainted. Especially interesting to note in this connection is the fact that more and more product designers and design engineers are designing products and components with this specific purpose in mind. The trend is to mask the high surface and paint the low one. The only exception to this concerns illuminated design work in plastics.

Volume of work or regularity of use constitutes the basic determinant of whether or not metal masks provide the best answer to the masking problem; of course, still other considerations may enter the picture. For example, suppose that only three or four parts per day are to be masked. In this case, a single mask or a set of masks would prove sufficient, as ample time would be available for cleaning them. In all probability, one mask would prove its value from the investment-cost standpoint.

But suppose, instead, these same parts were fabricated but once a year and all finished in a single batch. In this instance, several masks may be needed to permit sufficient cleaning time without impairing production, and this added expense might not be warranted.[3]

"Home-made" cut-out sheet metal masks fitting the section to be shielded may prove entirely satisfactory on the simplest jobs. However, many finishing shops do not have adequate facilities for cutting complicated patterns from heavy-gauge metal. That being the case, the wisest procedure and invariably the most economical in the long run—is to get the masks made up in a regular metal-working shop or to secure them from companies recognized as specialists in the art of designing and electroforming snug-fitting templates expressly for spray-finishing use. Concerns with wide experience along this line include Duggan Masking Devices, Detroit, Mich.; Conforming Matrix Corporation, Toledo, O.; Vertrod Corp., Brooklyn, N. Y., and Thierica Studio, Grand Rapids, Michigan.

A method of "cold casting," electroforming is a process in which the unit is fabricated through electrodeposition of a metal shell upon a removable, shaped mandrel or pattern. The outstanding advantages of this fast-growing fabricating technique, such as the strength of one-piece construction in thin-walled parts, and reproduction of detail, are nowhere better realized than in paint masks, as it provides much sharper detail and permits the design of more complex masks than can be made by hammering, bending and brazing construction.[4]

The procedure itself is relatively simple. The mandrel, made from any one of a number of materials (a low

melting alloy, aluminum, wax, Plaster of Paris, wood, stainless steel) that can be made impervious to water as well as electrically conductive, is cast, machined, or formed by any means to obtain the desired shape. The mandrel is immersed in a suitable electroplating bath to make a metal negative—the electroforming—which is built up in thickness of metal deposit as desired. Or, the part to be sprayed can be used in making the spray mask.

Electroforming generally is performed with copper, iron or nickel, occasionally with other metals. Each provides some advantages over the others, so that depending upon the object to be electroformed and the use to which it is applied, one metal or a combination of two shows definite advantages. Electroformed copper is relatively stress-free compared to iron or nickel, but has lower strength and hardness properties. Deposited at high rates, it requires heavier deposits than the other two metals to obtain equivalent strength.[4]

Of the three, iron offers the lowest metal cost. While possessing intermediate physical properties, it can be heat treated to produce a case hardness of 675 Brinell, although warpage may be encountered as a result of treatment. Nickel can be deposited with a hardness of 150-425 Brinell with corresponding ductility values of 30-6 per cent respectively in 2 inches, and tensile strengths of 51,000-152,000 p.s.i. These values, controllable, depend upon current density, solution composition, pH, and temperature. Nickel offers the advantages of good physical properties and good corrosion-resistant qualities.[4]

A suitable mask must meet several exacting requirements if it is to provide the quality results and long service expected by the user—and a well-designed, precision-made mask is built on the basis of these essential requisites. A good, durable mask should:[3, 5]

1. Provide snug fit over any shape or contour.

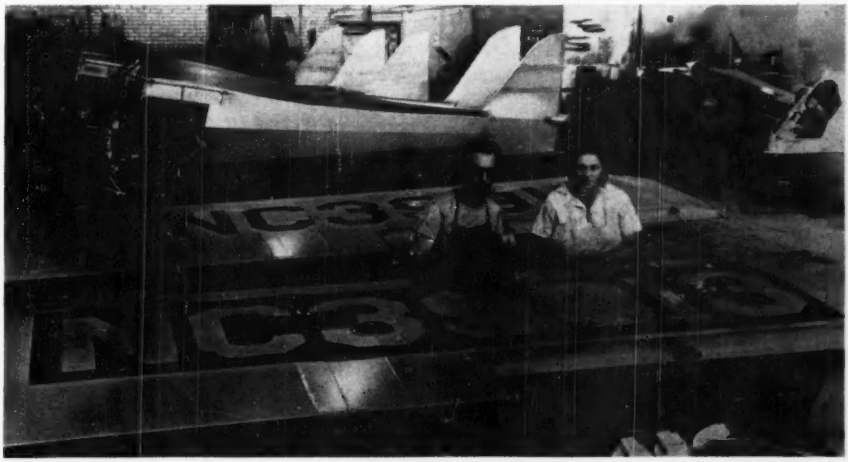


Fig. 3—Taylorcraft, famous builder of light planes for business and pleasure, has reduced time of masking for airplane identification numbers on both wings and tail surfaces by using metal stencils, which are made to conform with desired spacing. As a result, time-consuming measuring and pencil marking, formerly practiced, are no longer necessary. Masking tape is quickly applied to fasten and hold stencils to surface securely; color is sprayed in short order.
*(Photo courtesy Taylorcraft, Inc., Conway, Pa.)*

2. Be sufficiently rigid for indefinite shape retention.
3. Have an accurate, well-defined "lip" at its "work" edge, assuring production of sharp, clean, color-separation line.
4. Prove capable of repeated use between cleanings.
5. Assume its position accurately and surely, hold firm, then come off the work easily without smearing operator's hands.

Essential features such as these make any expertly designed electroformed mask more than "worth its weight in gold" from all standpoints.

Form-fitting masks are of three general types: (1) lip type; (2) plug type, and (3) block cut-out plane surface type.[3, 5] Let's examine each briefly.

The lip type, as its name obviously implies, has a "lip" which, in the case of painting a depressed or sunken name or design, projects or extends either part way or all the way down the sidewalls of the depressed sections. On the other hand, where an elevated surface must be protected while finishing the background (for example, the embossed letters of a chromium-plated nameplate), this stop-off contour must be formed to cover the embossing's sides, completely capping them. Bridging holds "loose" centers of letters and numbers in place.

It is the combination of an electroformed mask's snug fit over the work and its thin yet strong lip that prevents fogging and permits a clean, clearly defined paint line. Capping a raised or embossed area takes advantage of this same lipping principle.[5]

Generally speaking, it is preferable to cap a relief area whenever possible so that the spray is directed from behind the mask edge. Multi-color pieces can be so designed to permit wet application of two or three colors in succession requiring only one bake operation. In these instances, masks are relieved—"built off"—opposite those surface areas on the workpiece previously finished and still wet. As can be easily realized, substantial economies are effected whenever it is possible to eliminate a baking operation.

Widest application of the plug-type mask is found with clear plastics that have been molded in depth from the back, such as automobile horn buttons and instrument panels. Here, too, as with the lip-type mask, the highly essential feature of snug form-fitting over the work is assured by electroforming directly into the design of the part.

Then the plug is cut out and finished, after which fine wires are attached. These wires are joined, in turn, to a frame, thereby giving the en-

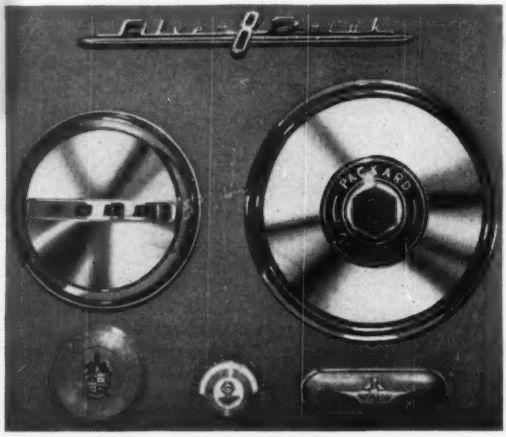



Fig. 4—Shown here are a few of many typical examples of metal stampings, die castings and molded plastic parts which are painted on a high-production basis with electroformed steel-faced spray finishing masks specially designed and developed by Duggan Masking Devices, Detroit, Mich.
*(Photo courtesy Duggan Masking Devices, Detroit, Mich.)*

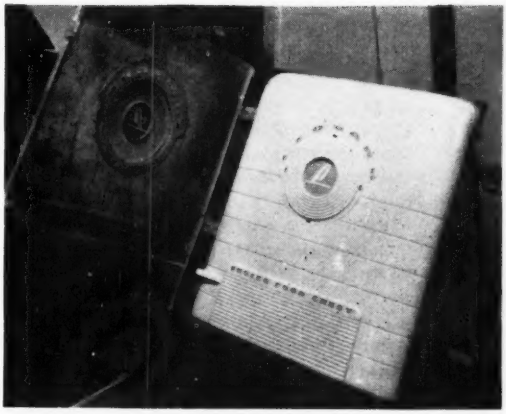


Fig. 5—Form-fitted mask equipped with clamp jig accurately confines spray to areas to be painted. Mounting is hinged to reduce operations in handling.
*(Photo courtesy Thierica Studio, Grand Rapids, Mich.)*

tire assembly rigidity and facilitating its handling.[5]

On plastic speedometer and radio dials in which clear depressed characters are illuminated by side lighting, plug masks are indispensable. This application on plastics has been extended to those molded in solid color subsequently decorated with additional colors on the face surface. Still another rapidly growing use of plug-type masks is for the spray painting of anodized aluminum stampings.

Which type mask—the lip type or the plug type—is better suited to handle a specific masking job for spray-color decoration depends upon three factors, which vary from one application to another. These are the design itself, width and depth of the lines to be painted, and the number of different colors to be applied. Bleeding or non-bleeding of paints upon application over a previously sprayed color also is a factor to be considered.

Generally speaking, plug masking depressions less than 1/32-inch deep are exceedingly difficult. Moreover, should the width be narrow also, the plugs are not sufficiently strong to permit practical handling for any reasonable length of time.

Parts with very small characters and fine calibration lines—radio knobs and range dial knobs, for instance—require different handling. On this class of work, perfect masking is not feasible, as the mask openings are so small that they fill up with paint immediately. Consequently, the operation of cleaning the mask takes longer than the spraying operation. Best practice, therefore, is to outline cut around each character or group of characters, relying upon the snug fit of the mask to confine the paint to a comparatively small area. Use of this practice reduces wiping time, according to many shops.

Fig. 6—Spray station rigged for single color application on four different work pieces. Shows method of mounting masks on fixtures for high production output.
*(Photo courtesy Thierica Studio, Grand Rapids, Mich.)*

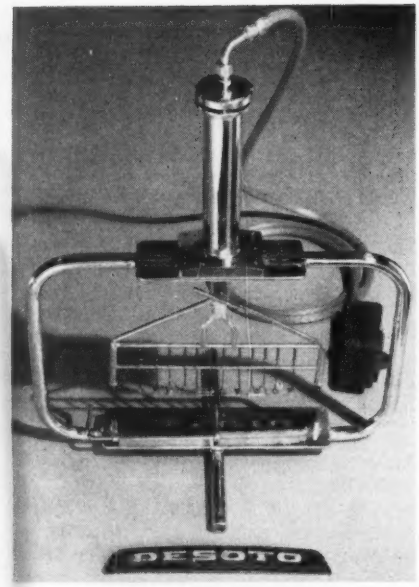



Fig. 8—An air-operated fixture with an interchangeable plug mask for painting around depressed letters in automobile identification plate. The operator, using this masking device mounted on a turntable, controls the lowering of the mask by means of a foot treadle on the floor. After painting is completed, the mask may be raised off the emblem by tripping the foot treadle again. A feature of the mask is that letters are individually spring loaded. *(Photo courtesy Conforming Matrix Corp., Toledo 2, Ohio)*

Stove dials are generally buffed quickly, using a hard wheel.[5]

The already wide, and still rapidly increasing, use of the block cut-out plane surface type mask clearly attests to the fact finishing economies are achieved in many instances even though wiping or buffing is required to complete the paint job. With stove dials, radio knobs and the like, generally fabricated from multiple dies or mold cavities, masks of this type are relieved so as to allow for dimensional variance of the multiple cavities. In many cases, even hobbed cavities are not identical, with the result that making masks for each die or mold often is required. This is particularly true in the case of lip-type masks.

While parts of many types can be finished simply by placing them on a turntable and putting the mask over them, there are other instances where fast, economical finishing requires that the mask either be equipped with or incorporated into a suitable holding fixture. In some cases, the mask is rigidly mounted in the spray booth and the workpiece brought to the mask; while in others, clamping fixtures are advised. Such is the case particularly where finishing involves work which shows a tendency to warp, or where its light weight and size lead to distortion from polishing.[5]

In mass production finishing a station is usually equipped to spray one certain color continuously except where the design permits applying a second color while the first is still wet. At such a station, the masks are mounted on fixtures to save handling operations and all parts requiring the same color, regardless of size and shape, are sprayed there.

Frequently, as in the case of an emblem in one color, and lettering in another, the same mask is used for both colors on the piece of work, and the station is equipped with a spray gun for each color so that one setting of the mask at a single station serves for both colors.

Again, electroformed masks can be designed specifically for the purpose of attaching them to parts in a monorail or merry-go-round conveyor installation for either manual or fully automatic spraying. To obtain maximum benefit from such masks, however, the mask maker must know exactly how the part to be finished is handled so that the mask can be designed with this consideration in mind.

Finishing a complex-shaped or intricately-designed piece frequently proves more costly than the components themselves. On the drawing board, a design may appear wonderful; but

when transferred to the production-finishing line, it may prove very expensive if the mold has not been cut on the basis of practical masking procedures. Plastics offer a good example of this.

Best practice, therefore, is to consult a reputable mask maker while the product is still in the drawing board stage. It is well to remember, however, that precision masks must be made from representative production-run parts.

Proper cleaning and care of masks are essential for obtaining maximum efficiency and economy from these dependable contributors to quality decorative finishing. Cleaning is readily accomplished by immersing the mask in a suitable solvent, placing the piece with the soiled side down. If the mask is leaned at an angle, then the soiled side should be placed on the underside. Thus, the softening material will be removed away from the plate.[2]

If the material sprayed is lacquer, then lacquer thinner should be used as the cleaning solvent. However, for most other materials, such a solvent (provided it is compatible) as xylol or toluol usually proves preferable. After being soaked clean, the mask should then be swirled briefly in clear lacquer thinner to dissolve the final remaining traces of paint as well as to expedite drying. This is particularly important when it is remembered that the spray may blow out any entrapped solvent, thereby spoiling subsequent finishing work.

Electroformed masks, like other precision-made tools, should be well cared for as they may well represent a considerable investment from the initial cost standpoint. Therefore, as the first step toward getting your money's worth make certain that operators do not handle masks roughly. Moreover, when not in use, keep them in a suitable storage space to further protect them from possible damage.[2] An electroformed mask, provided it is well handled, is practically indestructible, frequently outlasting the dies from which parts are stamped.

As a representative indication of the cost savings attainable with electroformed masks in production-finishing operations, the experience of one major automobile manufacturing plant may be cited. Formerly, raised surface hub caps were sprayed and excess paint

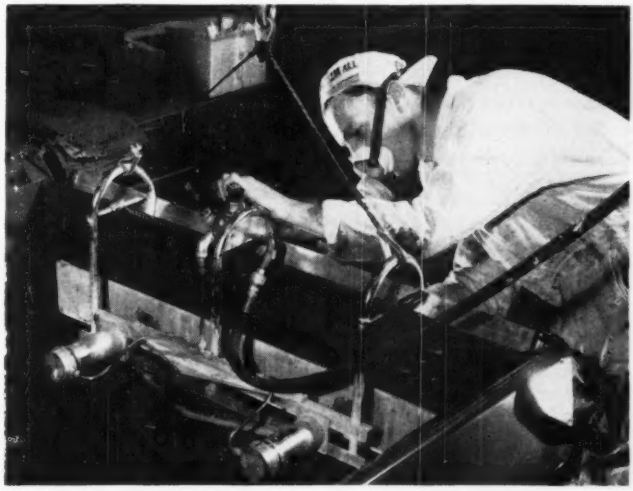


Fig. 7 — Metal lettering stencil is clamped to pickup truck tailgate by air cylinders controlled from single valve at center to spray embossed letters in white enamel. Connecting of air line to mask assembly is expedited by quick-acting connector. No heavy lifting is required by operator, as this is performed by overhead spring balancer on monorail track. Cylinders, 1¼ inches in diameter and 2-inch stroke, operate on 45 to 50 p.s.i. air pressure. (*Photo courtesy The Studebaker Corporation, South Bend, Ind.*)

Fig. 9—Using this foot-treadle-operated air-controlled masking unit, gold paint is applied to the emblem with the aid of a lip-type mask. After the gold paint has been applied to the letters, the entire back is painted blue with the aid of another mask, using the same masking fixture.
*(Photo courtesy Conforming Matrix Corp., Toledo 2, Ohio)*

then buffed off—a job requiring 10 buffers per 8-hr. shift. Now, by using a Duggan electroformed paint mask, 18,000 hub caps per day are painted with one operation, completely eliminating the need for buffing.

For decorating and marking concave, convex and irregularly shaped objects with paint, contour spray stencils such as those made by Adolph Gottscho, Inc., New York, are also finding increased use. These stencils, of brass and copper in various gauges and conforming closely to the contour of metal, glass, fiber and plastic products and containers, effectively mask out backgrounds for clear, sharp reproduction, without objectionable halos or ragged edges, of trademarks, lettering, insignia and other designs.

AUTHOR'S ACKNOWLEDGMENT

Grateful acknowledgment is hereby made to the following companies for their cooperation in supplying data included in this article:

Duggan Masking Devices
Detroit, Mich.

Conforming Matrix Corporation
Toledo 1, Ohio

Adolph Gottscho, Inc.
New York, N. Y.

Vertrod Corp.
Brooklyn, N. Y.

Thierica Studio
Grand Rapids 6, Mich.

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5. Spray Color Decoration With Form-Fitting Masks, Hamilton E. MacArthur, "Organic Finishing," Guidebook Directory - Issue, April 1948, pp. 132-136.

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Long before Caesar's time, the natives of India used shellac on their temples and homes.
—*"Dyelines and Bylines," American Cyanamid Co., Calco Chemical Div., New York, N. Y.*

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Electrolytic tinplate, which has largely supplanted the hot dip method of manufacture in the postwar era, conserves over fifty per cent of the nation's tin supply, according to the American Electroplaters' Society.

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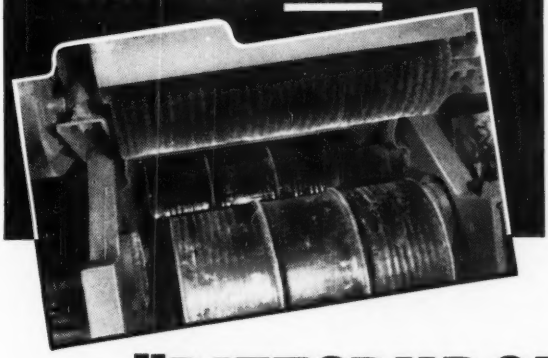

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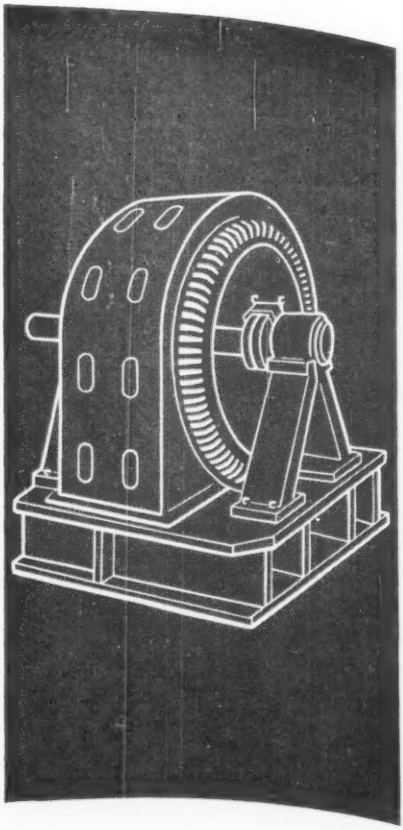

Here is one of many cases where a "Finishing Specialist's" *up-to-the-minute* knowledge of latest finishing methods resulted in a money-saving solution to a manufacturer's problems. An eastern manufacturer of electrical equipment was experiencing slow production because of the drying time required for the filler he was using. A Lowe Brothers "Finishing Specialist" was quick to suggest a modern application technique* that reduced finishing costs without sacrificing the quality of finish. Two separate brushing operations were eliminated! Drying time was greatly reduced! Efficiency was stepped-up throughout the entire finishing operation!

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*This advertisement is based on facts from the Lowe Brothers Industrial Case History Files.*

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# 1950 Annual Meeting

## Federation of Paint and Varnish Production Clubs

**CONGRESS HOTEL—CHICAGO, ILLINOIS**
**NOVEMBER 8, 9, 10, AND 11**

### WEDNESDAY, NOVEMBER 8

2:00 P. M. Registration
Annual Council Meeting
6:00 P. M. Council Dinner

### THURSDAY, NOVEMBER 9

8:00 A.M. Registration
9:30 A.M. Paint Industries' Show Opens
10:00 A.M. Meeting Opens
Greetings: A. T. MONTANYE, *President*
Welcome: P. M. DELEEUW, *President of Chicago Club*
Welcome: T. F. BYRON, *Chairman of Host Committee*
"The Effect of Zinc Oxide on Architectural White Alkyd Enamels" (*Western New York Club*)
"Accelerated Yellowing Tests on White Enamels" (*Baltimore Club*)
Report of Paint Industries' Show Committee: C. J. OVERMYER, *Chairman*
Annual Report of the President: A. T. MONTANYE

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Address by J. F. BATTLEY, *President of the National Paint, Varnish and Lacquer Association*
Report of Materials Committee: W. P. COLIO, *Chairman*

12:00 Noon Luncheon

2:00 P. M. "Water in Oil Emulsion Varnishes and Paints" (DR. WOUTER BOSCH)
Report of Standards & Methods of Tests Committee: M. A. GLASER, *Chairman*
The Joseph J. Mattiello Lecture: T. F. BRADLEY
"A Theoritical and Statistical Study of Sward Rocker Hardness Determinations of Paint Films" (*Oil & Colour Chemists' Association*)
"Evaluation of Bodying Agents in Gloss Enamels" (*Golden Gate Club*)

4:10 P. M. Annual Business Meeting

6:00 P. M. Twenty-five Year Club Dinner

8:30 P. M. Annual Bridge Tournament

## FRIDAY, NOVEMBER 10

8:00 A.M. Registration

9:30 A.M. Paint Industries' Show Opens

10:00 A.M. Meeting Opens
"Measurement of Hiding Power Using the Hunter Reflectometer" (*Toronto Club*)
Report of Joint Federation-Association Educational Committee
Report of Manufacturing Committee: N. T. PHELPS, *Chairman*
Address by DR. A. P. HAAKE, *Consultant to General Motors*
"A Torque Meter for Measuring Power to Plant Mixers" (D. E. MACK and V. W. UHL, *Lehigh University*)
Report on Foreign Activities

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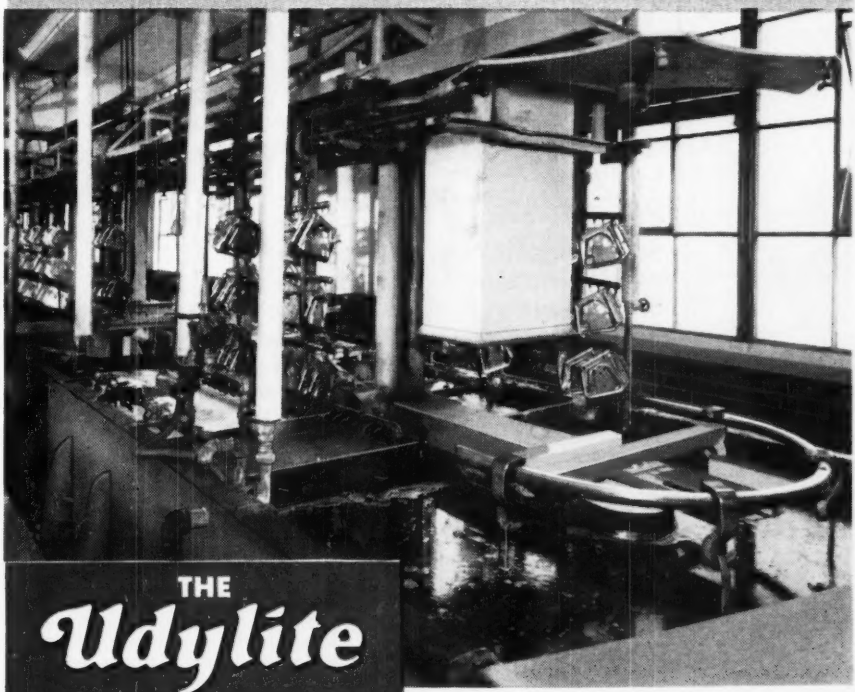

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12:00 Noon Luncheon

2:00 P. M. "A Method for the Evaluation of Alkyd Resins for Stoving Finishes" (*Birmingham Club*)
"Standard Methods of Testing and Evaluating 'Deep Tone' Flat Wall Paints" (*New York Club*)
REPORT ON THE FEDERATION RESEARCH PROGRAM: P. O. BLACKMORE, J. S. LONG, AND W. O. LUNDBERG
Project reports by individuals and clubs

7:00 P. M. Annual Banquet—Awards and Entertainment

10:00 P. M. Dance

## SATURDAY, NOVEMBER 11

8:00 A.M. Registration

9:30 A.M. Paint Industries' Show Opens
Meeting Opens
PLANT PRODUCTION PROBLEMS (*Session One*)
Round Table Discussion on "Raw Materials Handling"
Report on Activities of the Scientific Section:
J. C. MOORE, *Director*
PLANT PRODUCTION PROBLEMS (*Session Two*)
"Processing"
New York Club Paper on Dispersions
Northeastern University Paper on Fineness of Grind
Scientific Section Paper on Dispersion Studies
Round Table Discussion on Processing
PLANT PRODUCTION PROBLEMS (*Session Three*)
Round Table Discussion on "Packaging and Shipping"
Resolutions and Announcements


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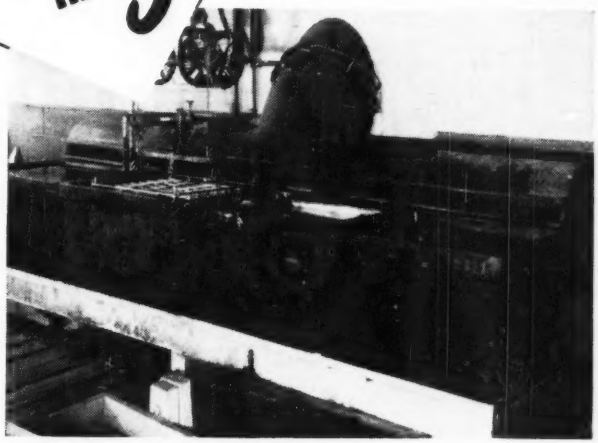

Only HAVEG offers you this practical plan to *permanently* control corrosion of metal finishing equipment:

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# Spotlighting FINISHING Progress

## Corrosion of Composite Electroplated Coatings

By DR. ALLEN G. GRAY

AT the Symposium on Theoretical Electrochemistry, held at the 97th meeting of the Electrochemical Society, J. E. Stareck, United Chromium, Inc., Detroit, discussed the mechanism of corrosion of composite electrodeposited coatings and brought out the fact that for best anti-corrosion results in the case of chromium plated articles one must consider other factors than just the thickness of the coating alone. Dr. Stareck, on the basis of results obtained from salt spray and outdoor exposure tests, proposed several basic rules which appear to govern the mechanism of corrosion in single as well as in composite types of coatings.

According to Dr Stareck, a recognized method of minimizing corrosion, in the case of plated coatings, is to increase the plate thickness; however, little attention has been given to the corrosion cell itself. Four main factors in the cell determine the type and the rate of base metal corrosion. These are: (1) the magnitude of the cell potential; (2) the resistivity of the conducting medium or electrolyte; (3) the degree of passivity of the respective metals; and (4) the polarity of the base metal with respect to the coating. The individual importance of these factors is determined primarily in (1) by the relative position of each metal or alloy in the galvanic series for the particular

A Monthly Digest of Current Technical Progress Indicating Significant Trends and Developments in the Finishing Industry

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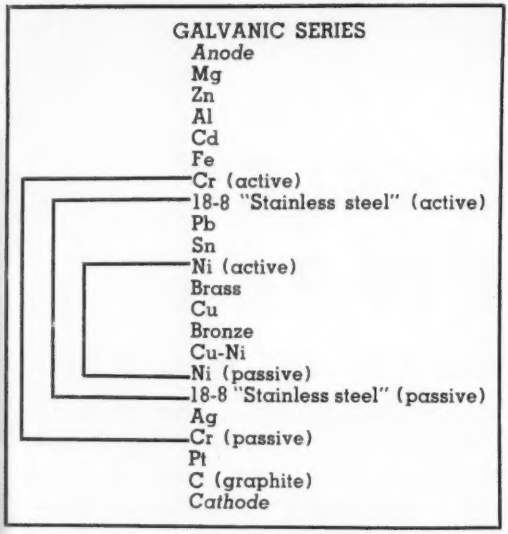


Fig. 1—Data taken from paper presented by Dr. J. E. Stareck before the 97th meeting, Electrochemical Society, Cleveland.

environment under consideration; in (2) by the type and concentration of the electrolyte present in the cell pores; in (3) by the peculiar properties of the metals involved, and the environment to which they are subjected; and in (4) by the proper choice and order of the composite metal coatings. The maximum in performance of plated metals can be attained only by proper application of each of the above factors.

The relative position in the galvanic series of the more common metals and alloys ordinarily used in composite metal coatings is presented in Fig. 1. One fact pointed out by Dr. Stareck was the pronounced shift in the cathodic direction of chromium, stainless steel, and nickel as they change from an active to a passive state. This series is applicable to most outdoor exposure conditions and is also useful in interpreting accelerated corrosion tests such as are obtained by means of the salt spray. The nature of the environment is important, and helps determine the relative position of each metal in the series. Such factors as the thickness of plate, the solubility and adherence of corrosion products, the conductivity of the cell, the possibility of complex ion formation, and the pH of the conducting medium and other factors are also important.

**Effect of Plate Thickness**

When an anodic condition of the base metal is encountered as in the case of electroplated nickel plus chromium over steel, the rate of "accelerated pinhole" corrosion of the base metal is retarded as the thickness of the nickel coating is increased. This is due in part to the fact that the porosity of the deposit decreases with increasing thickness and in part to the fact that the composite potential of the plated base metal approaches more and more the potential of the applied nickel coating as the thickness is increased. The final result is that the cell potential between the chromium and the steel is substantially decreased but still active and with the original polarity. The chromium in this case being cathodic largely retains its original appearance except for the pinhole corrosion spots.

In the recent "Corrosion Handbook," sponsored by the Electrochemical Society (John Wiley & Sons), Dr. W. A. Wesley, International Nickel Company, brought out some points with respect to the protective value of nickel coatings to which reference was made in Dr. Stareck's presentation. Accord-

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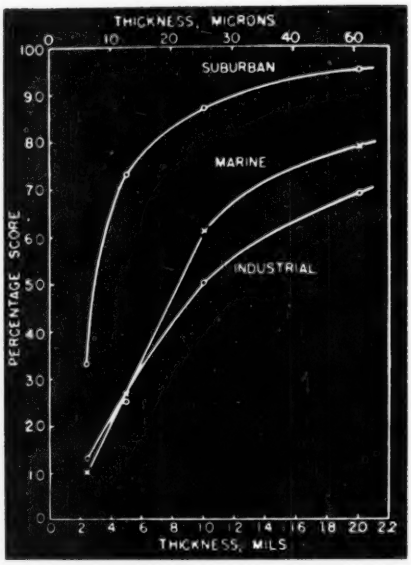
Fig. 3—These curves from the "Corrosion Handbook" indicate that the protective value of nickel coatings on steel varies with exposure conditions.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PERCENTAGE SCORE
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0 2 4 6 8 10 12 14 16 18 20 22
THICKNESS, MILS

ing to Dr. Wesley, the porosity of nickel electrodeposits on various base metals, as measured by conventional porosity tests, is extremely variable at thicknesses below 25 microns (1 mil). However, most of the reported values for salt spray and ferroxyl tests lie within the shaded area of Fig. 2 and its extensions. When the best plating practice is followed and good quality base metal is employed, the ratings will lie near the left and lower borders of the shaded zone. The fact that an increase in coating thickness above 25 microns tends to override other variables and guarantees low porosity is evident from the necking down of the shaded zone to the right.

The minimum thickness of deposit required to maintain a pleasing appearance varies with the nature of service. This point is illustrated in Fig. 3, where coatings 12.5 microns (0.5 mil) thick showed approximately the same rating in suburban atmospheres as those 25 microns (1 mil) thick in marine atmospheres, whereas a thickness of 50 microns was required to equal this performance at industrial sites. It has been estimated that plated coatings which maintain a satisfactory appearance for more than a year in the suburban atmospheres, represented in Fig. 3, will last almost indefinitely indoors under normal household or office conditions.

Occasions may arise when the choice of base metal may be influenced by the thickness of coating required for satisfactory protection of the metal selected. Figure 4 is based on cooperative exposure tests reported in the

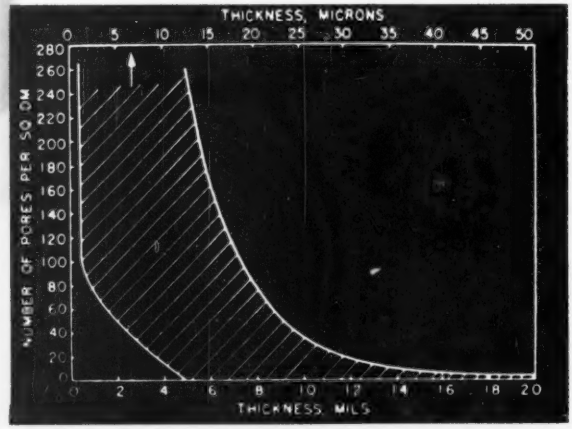


Fig. 2 — Results of conventional porosity tests of nickel coatings as given in the "Corrosion Handbook" (John Wiley & Sons).

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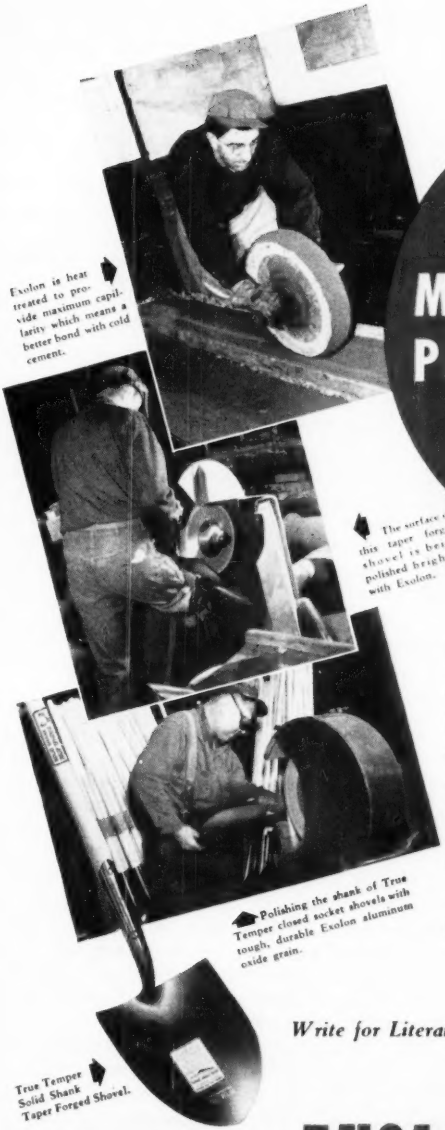

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"Journal of Research," National Bureau of Standards. From this figure can be judged the relative thicknesses of coating required on different base metals to afford about the same degree of protection to each. Thus, a coating thickness of 30 microns (1.2 mils) on steel was about equivalent

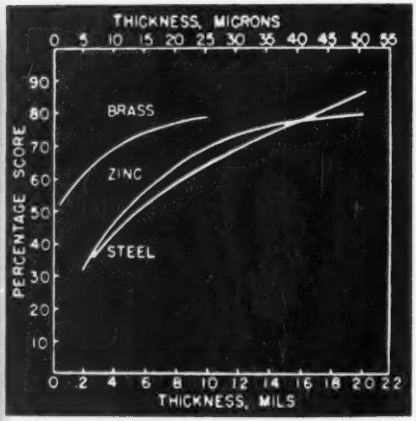


Fig. 4—Effect of thickness of nickel (or nickel plus copper) on corrosion ratings, based on cooperative exposure tests reported in the "J. Research," Nat. Bur. Standards, and referred to in the "Corrosion Handbook"

to one of 25 microns (1 mil) on zinc alloys or 10 microns (0.4 mil) on the brasses.

### Cathodic Protection of The Base Metal

Recent studies conducted by Dr. Stareck indicate that by proper choice of intermediate coatings, the polarity of the corrosion cell can, at least in favorable cases, be reversed in sign and the base metal corrosion retarded as a result of cathodic protection. These studies also indicate that achieving, or at least approaching, a cathodic state of the base metal is for best performance just as important as, and in some cases more important than, increased thickness of the deposit alone. However, a combination of these and other factors is desirable.

Cathodic conditions for protecting the base metal against corrosion are in some cases obtained automatically, as for example when steel is plated with zinc or cadmium. However, when other metals, such as nickel or chromium, are used for decorative finishes on steel, their more noble character makes the problem of obtaining cathodic protection of the base metal more difficult.

Corrosion data on various combinations and thicknesses of lead on steel, with and without an underlying copper layer, covering several years of outdoor exposure, have been reported by Dr. H. A. Pray, Battelle Memorial Institute, in the A.S.T.M. Proceedings. A study of this data shows that a copper strike on steel under lead coatings, when exposed to outdoor atmosphere, increases the rate of rusting of the steel for thicknesses of lead below approximately 0.2 mil. But as the thickness of lead is increased beyond this value, not only does the relative corrosion resistance of the coatings improve but actual inhibition of rusting of the plain unplated steel is observed in certain locations.

According to Dr. Stareck, since both lead and copper are more noble than steel, if one justifiably reasons that as the thickness of plate is increased, the pore area decreases, then it can logically be concluded that the composite potential of the plated base metal will gradually approach the potential of the metal plated. Thus, increasing thicknesses of copper on steel alone make the steel-copper composite electrode potential approach that of pure copper, but the steel is still anodic to the copper.

However, when lead is applied over copper plated steel the resulting cell eventually becomes one mainly between lead and copper, with the copper acting cathodic to the lead. The secondary anodic influence of the steel becomes less and less as the lead thickness is increased and is finally over-

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|---|---|
| QQ-P-416 | "Lithoform," "Zinodine" |
| RR-C-82 | "Lithoform" No. 32 |
| MIL-C-5541 (See also QPL-5541-1) | "Alodine" |
| MIL-S-5002 | "Alodine," "Granodine" (Dip, Spray and Brush grades) |
| JAN-C-490, Grade I | "Granodine" (Dip, Spray and Brush grades) |
| JAN-F-495 | "Granodine" (Dip, Spray and Brush grades), "Lithoform" |
| JAN-L-548 | "Permadine" |
| AN-E-19 | "Alodine," "Zinodine" |
| AN-F-20 | "Alodine," "Granodine" (Dip, Spray and Brush grades), "Lithoform," "Permadine," "Thermoil-Granodine," "Zinodine," (See also U.S.A. 3-213) |
| U.S.A. 57-0-2 | |
| Type II, Class A | "Thermoil-Granodine" |
| Type II, Class B | "Permadine" |
| Type II, Class C | "Granodine" (Dip, Spray and Brush grades) |
| U.S.A. 51-70-1 | |
| Finish 22.02, Class A | "Thermoil-Granodine" |
| Finish 22.02, Class B | "Permadine" |
| Finish 22.02, Class C | "Granodine" (Dip, Spray and Brush grades) |
| U.S.A. 50-60-1 | "Granodine" (Dip, Spray and Brush grades) |
| U.S. Navord O.S.675 | "Alodine" |
| U.S.N. Appendix 6 | "Lithoform" |
| Navy Aeronautical M-364 | "Permadine," "Thermoil-Granodine" |
| AN-C-170 | (See MIL-C-5541) |
| U.S.A. 72-53 | (See AN-F-20) |
| AXS-1245 | (See JAN-C-490) |

## *Rust Removing and Metal Conditioning Chemicals*

| SPECIFICATION NUMBER | ACP SPECIFICATION CHEMICAL |
|---|---|
| JAN-C-490, Grade II | |
| Type 4 | "Deoxidine" Nos. 126, 512, 526, 624, 670 |
| Type 5 | "Deoxidine" Nos. 170, 171, 670 |
| U.S.A. 3-213 | |
| Type I | "Deoxidine" (Wash-off grades) |
| Type II | "Deoxidine" (Wipe-off grades) |

## *Metal Cleaning Chemicals*

| SPECIFICATION NUMBER | ACP SPECIFICATION CHEMICAL |
|---|---|
| JAN-C-490, Grade II | |
| Type 2 | "Ridoline" |
| Type 6 | "Ridosol" |
| U.S.A. 3-192 | "Ridoline" No. 3192 |
| U.S.N. Appendix 6 | "Deoxidine" |

## *Acid Inhibitors, Pickling*

| SPECIFICATION NUMBER | ACP SPECIFICATION CHEMICAL |
|---|---|
| U.S.N. 51-1-2 | "Rodine" |

*Write us for descriptive folders and further information on the specification chemicals listed above. Additional copies of this chart are available on request.*

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come and reversed in sign by the stronger opposing copper-lead couple, which because of its larger exposed area, finally determines the polarity of the corrosion cell. Thus, the steel is forced into a pseudo-cathodic or more noble position by a larger opposing force. It was pointed out that actual reversal of polarity of the base metal can be shown experimentally by measuring potentials of steel coated with increasing thicknesses of plate and measuring the composite electrode potential against a suitable reference electrode.

The effects of copper under zinc on steel, and zinc alone on steel were also discussed by Dr. Stareck. The increased cathodic protection of the base metal produced by the copper undercoating may be demonstrated experimentally by the fact that in the salt spray, zinc will protect bare steel from rusting to a distance of about ⅜ inch from the edge of the zinc coating; whereas, if copper is applied under the zinc, the distance is increased to about ½ inch.

It was pointed out that this result can only be due to the greater potential between the steel base metal and the zinc as a result of the cathodic effect due to the copper. The more rapid initial accumulation of corrosion products of zinc over copper also supports this conclusion. However, in this latter connection it can be noted that as the thickness of zinc sacrificially decreases, the cell potential also decreases, and it would be expected that the rate of corrosion would decrease accordingly. Salt spray and outdoor exposure tests have actually shown this to be the case. The electrolytic cell appears to be virtually eliminated and corrosion progresses at a retarded rate largely through the chemical attack afforded by the environment. The final result is that copper under zinc over steel is more corrosion resistant than


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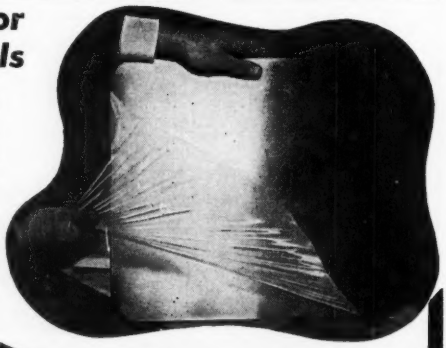

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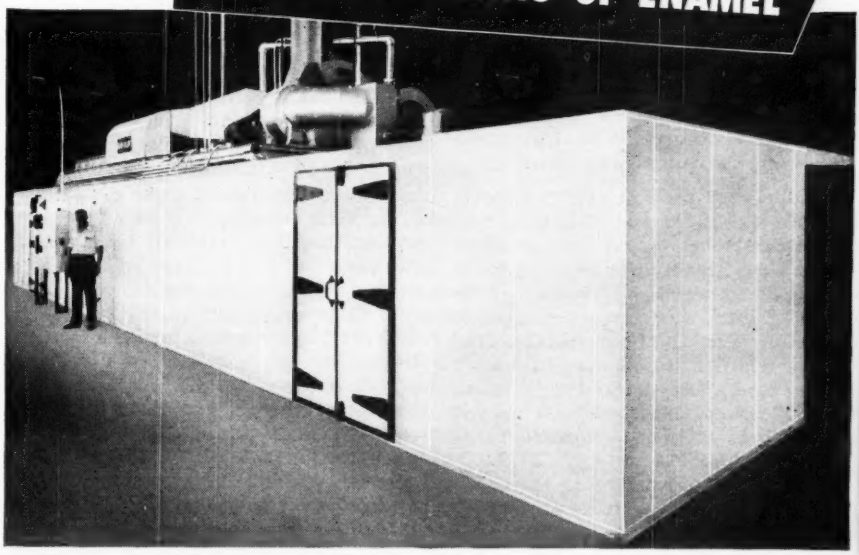

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|---|---|---|---|---|---|
| a. | —— | —— | 1.0 | 0.01 | 1.0 |
| b. | 0.5 | —— | 0.5 | 0.01 | 1.0 |
| c. | 0.45 | 0.05 | 0.5 | 0.01 | 1.0 |
| d. | —— | —— | 0.5 | 0.01 | 0.5 |
| e. | 0.25 | —— | 0.25 | 0.01 | 0.5 |
| f. | 0.2 | 0.05 | 0.25 | 0.01 | 0.5 |

plain zinc over steel in thicknesses greater than about 0.1 mil. A similar situation was observed in the case of cadmium.

### Composite Coatings With Unusually Good Corrosion Resistance

In applying this theoretical treatment to a number of composite coatings Dr. Stareck found that a silver strike a few hundredths of a mil thick on copper, followed by nickel and chromium, offers better protection against corrosion than the same total thickness of nickel or of copper-plus-nickel under chromium without the silver layer. Some of the combinations and thicknesses of coatings studied are listed in the above table.

It was reported that in tests on outdoor exposure and in the salt spray, **f** was far superior to **d**, and **c** far superior to **a**. However, the difference between **a** and **b**, and **c** and **d**, was less pronounced, **b** showing up better in the salt spray and **a** showing up somewhat better on outdoor exposure tests. In another test, a strike of tin under the copper materially added to the corrosion resistance, and a combination of coatings with 0.015 Sn, 0.2 Cu, 0.05 Ag, 0.25 Ni, 0.01 Cr, having a total plate thickness of only 0.5 mil stood up approximately twice as well as double the thickness of nickel alone under chromium.

### Basic Rules Governing Corrosion of Plated Coatings

Based on the results obtained on the corrosion of composite electrodeposited coatings, Dr. Stareck formulated the four basic rules outlined below, which appear to govern the mechanism of corrosion in single as well as in composite types of coatings:

1. In the galvanic series of metals any metal applied to another lower in the series will inhibit corrosion of the basis metal, and may provide cathodic protection if the applied metal is more anodic than the potential required of the basis metal to prevent its corrosion in that same environment.

2. Conversely, any metal applied to another higher in the series will tend to promote pinpoint type of corrosion of the basis metal whenever the potential of the applied metal is more cathodic than the potential at which anodic corrosion of the basis metal occurs.

3. When two or more composite metal coatings are applied to a basis metal, greatest inhibition of corrosion of the latter is obtained in a given environment when the most noble of the applied metal coatings is directly beneath the outer surface metal; and cathodic protection by means of more noble metals is possible if the difference in potential between the most noble and the least noble of the applied metal coatings under the conditions of test is greater than the potential required of the basis metal to prevent its corrosion in that same environment.

4. When two or more composite metal coatings are applied, corrosion of the basis metal is encouraged in a given environment whenever the most noble metal is applied on the outside surface.

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## Adherence Tester May Be Useful in Evaluation and Formulation of Organic Finishes

RECENT work on the Interchemical Adherometer reported by C. J. Rolle and T. L. Dietrich has resulted in a method for resolving the stripping force measurements of organic coatings on metal surfaces into the basic factors of plasticity and adhesion. This work was part of a general investigation of the adhesion of organic coatings on metal surfaces conducted by the Interchemical Corporation Research Laboratories under contract with the U. S. Navy Department, Bureau of Ships. According to Rolle and Dietrich, all methods of measuring the stripping force of paint films which have been used up this time, including the time-honored thumbnail test, must necessarily result in a value which is the sum of the two basic factors cited above. This, however, does not provide the fullest information for a true evaluation of the film. A highly plasticized film might have good adhesion with a low toughness value. (See also "Analytical Chemistry," August 1949.)

In a different formulation the reverse might be true; yet, the sum of the two factors as represented by the stripping force in the equation developed in earlier work in the Interchemical Research Laboratories by Green and Lamattina could be the same in the two cases (see also "Analytical Chemistry, 20, 526, 1948). Separate values for each of these components in many cases would be of great importance to the formulator of organic finishes. The Interchemical Adherometer measures the force required for a sharpened ivory knife to remove or strip a 4 mm. width of film from the test panel. The stripping force, **F**, as measured on the instrument, can be expressed in terms of its three component forces by the equation:

$$F = T + P + A$$

**T** is the tear resistance of film on either side of the knife as it cuts its path through the coating, and **P** is the plastic resistance of the film to pushing action of cutting face of knife, which might be considered a measure of toughness of the film. **A** is the adhesion force at metal-paint interface.

In using the Adherometer previous to this most recent work, a method for determining the value of **T** was used which was based on shifting the cutting knife exactly 4 mm. laterally and measuring the force used in stripping a second band of film of the same width, which in this case, has only one edge subject to tearing. However, in view of the difficulty in moving the knife exactly this amount, Rolle and Dietrich developed a method whereby the knife is shifted somewhat less than 4 mm. for the second cut. By stopping this second cut a little short of the first, the width of both cuts can be accurately measured using a low power


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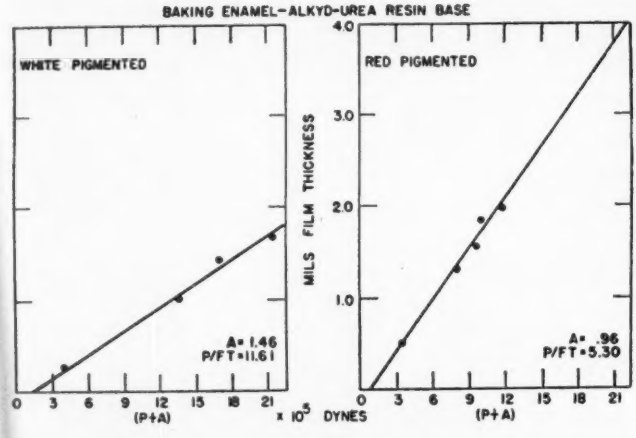


Fig. 5—Typical curves obtained in studies conducted in Interchemical Corporation laboratories to resolve the stripping force of organic coatings into the basic factors of plasticity and adhesion. (*Illustration courtesy "Analytical Chemistry"*)

microscope with hairline eyepiece. In using the instrument, the component force **T** is independent of the strip width, whereas **P** and **A** are directly proportional thereto. By a system of equations, using the result of two readings, it is possible to calculate the value of (**P—A**).

Using the instrument, it is possible to determine the adhesion factor and plasticity factor on the basis that the adhesion factor **A** is purely an interfacial attraction between the upper surface of the metal and the under surface of the paint film. Thus, it should be independent of the film thickness of the applied paint. On the other hand, the plastic resistance factor, **P**, is an intrinsic property of the film regardless of the metal on which it is applied. The value obtained, however, should be directly proportional to the thickness of stripped film.

The validity of these assumptions was proved over a wide range of typical organic coatings by preparing a set of four or five steel panels of each formula with a successive increasing number of applied coats in order to obtain a varying set of film thicknesses. The stripping force of these films was then measured, and the value of (**P—A**) was calculated. If these values (**P—A**) are plotted against the corresponding film thickness, a straight line relationship is obtained due only to the varying values of the **P** factor. The **A** factor, remaining constant throughout the series, should only cause a lateral shift in the curve to the right of the origin. Its exact value will then be represented by the distance from the origin to the intercept of the curve with the horizontal axis. After the value of the adhesion factor **A** is determined, the value of **P** follows easily by subtraction of **A** from each value of (**P—A**).

The final step is to reduce the varying values of **P** to the specific value for a unit film thickness of 1 mil—thus calculating the average value for **P/FT, FT** representing film thickness. This term is actually represented by the slope of the curve and can be considered a measure of the organic finish's toughness of resistance to deformation. Figure 5 shows typical curves obtained for an alkyd-urea resin base baking enamel. The method has been extended to the investigation of films on metals other than cold rolled steel. This technique should add a valuable tool for study of organic finishes.

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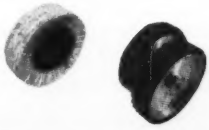

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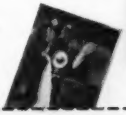

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## Palladium Plating Baths for Heavy Deposits

AT the Technical Session on Rare Metals, held as a part of the 97th meeting of the Electrochemical Society, a paper by E. M. Wise and R. F. Vines, International Nickel Company, described the development of a high efficiency chloride bath for the production of heavy, ductile deposits of palladium. The bath operates with soluble palladium anodes and was stated to be practically self maintaining because both the anode and cathode efficiencies are very high. It was reported that heavy deposits from this bath will withstand annealing without blistering and are ductile before and after such annealing treatments.

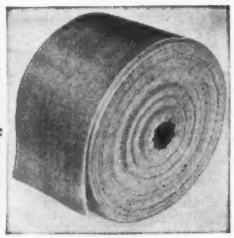
The composition of a palladous chloride bath for producing heavy deposits of palladium was given by Dr. Wise in a review of the platinum metals which appeared in the "Journal of the Electrochemical Society," March 1950. The composition recommended is given below:

| *Constituent* | *Concentration* |
|---|---|
| Palladium (as $PdCl_2$) | 50 g./l. |
| Ammonium chloride ($NH_4Cl$) | 20 - 50 g./l. |
| Hydrochloric acid (37% HCl) | approx. 100 cc./l. |
| pH (glass electrode) | .0 - 0.5 |

Operates at 122 deg. F.; cathode current density 10 amp./sq. ft. Agitation—air lift.

It is essential that the bath be free from other metals, particularly copper and silver, and that the anodes be of very high purity, and preferably made from palladium which has been melted under oxidizing conditions.

Dr. Wise pointed out that the complex nitrite bath is suitable for palladium deposits of moderate thickness. Baths of the double alkali nitrite type provide a desirable low metal ion concentration, and if moderate amounts of chlorides or bromides are present, solution of the anode results, so that this type of bath is self maintaining. The composition recommended for the

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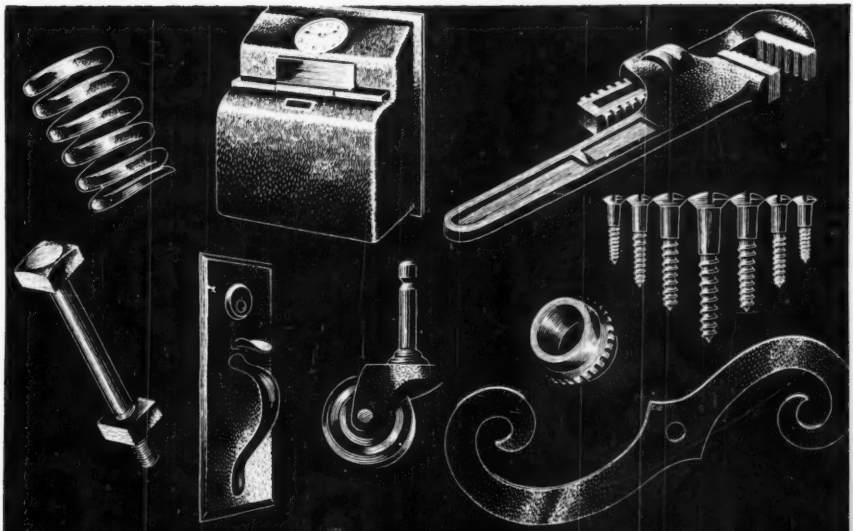

*Durable, matte black finish on iron and steel resists rust....* Parco Compound

This is the famous Parker rust inhibitor, constantly improved during the 30 years it has set standards for protection of iron and steel.

Parco compound adds greatly to the appearance of the treated parts. Combined with stains or oils, an attractive matte black finish is produced.

This treatment, still at its pre-war low cost, is more efficient than ever. Processing time has been cut, operation is simplicity itself, and results are uniformly excellent. The only limitation on size of parts treated is the size of the processing tank. Parco Compound can be used on complicated shapes, and on parts with close tolerances, too, since there is no appreciable change in dimensions.

Parco Compound may well be the answer to protect your iron and steel production from rust and corrosion. A request will bring full information. Write today.

PROTECTED BY Parco Compound PARKER RUST PROOF CO QUALITY RUST RESISTANT

*Bonderite, Parco, Parco Lubrite—Reg. U.S. Pat. Off.*

PARKER

PARKER RUST PROOF COMPANY
2172 East Milwaukee Ave.
Detroit 11, Michigan

BONDERITE—Corrosion Resistant Paint Base • PARCO COMPOUND—Rust Resistant • PARCO LUBRITE—Wear Resistant for Friction Surfaces

soluble anode, palladium tetranitrite type of bath is given below:

| *Constituent* | *Concentration* |
|---|---|
| Palladium (as $K_2Pd(NO_2)_4$) | 5 g./l. |
| Potassium chloride (KCl) | 10 g./l. |
| pH (glass electrode) | 6.0 - 6.5 |

Operates at 113 deg. F.; anode and cathode current denity—4 amp./sq.ft. Anodes—cold-rolled high purity palladium.

During World War II, palladium was available for unrestricted use, and it found extensive application as an ornamental and protective finish. It also was used to some extent as an underplate for rhodium. With rapid developments in the field of ultra high frequency applications, the use of palladium plating has increased steadily; the metal has assumed an important place with good possibilities for the future in the electronic industries. While palladium can be plated directly on copper and its alloys, a silver flash or plate is generally considered to be a desirable practice.

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**Maintenance Chemical Chart. Publication B-1,** describing the application and nature of chemical maintenance products offered by Fine Organics, Inc., 211 E. 19th St., New York 3, N. Y., has been released. Showing individual maintenance cleaning operations peculiar to divisions of plant and equipment maintenance, the chart provides helpful and ready reference material in the proper selection of cleaning agents. Short descriptions give use, application methods, and classification of chemicals, even to the inclusion of government specifications to which they conform.

SAFETY FOR YOUR MEN . . .
VALUE FOR YOU
with
U. S. NEOPRENE GLOVES

They help prevent costly accidents. • They withstand gasolines, oils, greases, and corrosive chemicals such as sulphuric, chromic, and muriatic acids, caustic and plating solutions. • The rough-surface fingers assure positive, easy gripping. • They're comfortable because the curved finger construction conforms to the natural curve of hand, eliminates straining and pulling. Highly flexible, they permit easy, natural working motions. These "U. S." gloves withstand tough service. Full range of sizes, lengths and weights. "U. S." technical men will be glad to analyze your glove needs and recommend the correct glove for your job.

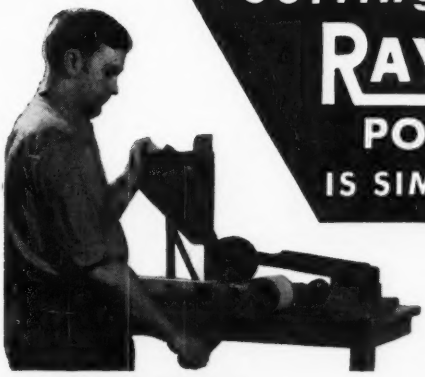
U. S. INDUSTRIAL GLOVES

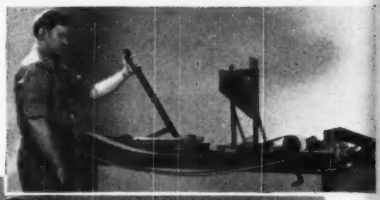
UNITED STATES RUBBER COMPANY

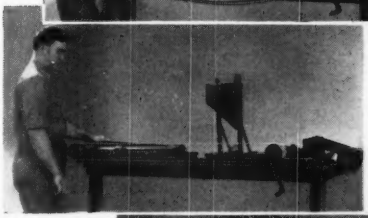
PAINT MIXER

MIRACLE
5 GALLON
PAINT REJUVENATOR
All paint restored to original consistency without opening the can.
*2 minutes per gallon.*
MIRACLE PAINT REJUVENATOR CO.
128 E. 10th St., St. Paul 1

# Setting up the NEW RAYON-RESIN POLISHING BELT IS SIMPLE — QUICK — EASY







## SIMPLE SET-UP FIXTURE CAN BE MADE IN YOUR SHOP

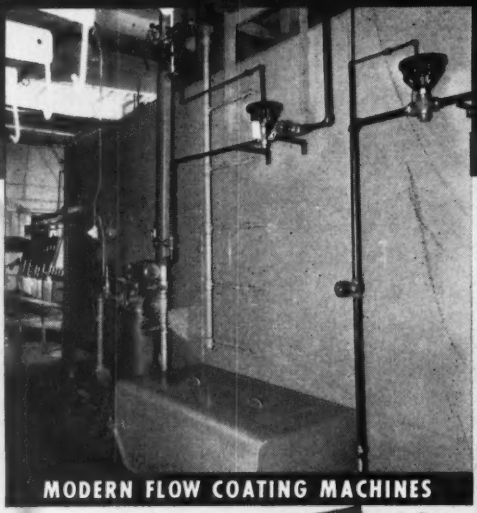
A simple set-up fixture, for resetting the Rayon-Resin polishing belt, can be made quickly and inexpensively right in your shop. This fixture consists of two sections clamped to a bench, and may be adjusted for any length belt. The five steps for setting up the Rayon-Resin polishing belt are shown.

1. With lever in "up" position, belt is placed over pulleys. 2. Lowering lever increases center distance, tightening belt. 3. Apply GRAINLOCK Cement to belt. 4. Abrasive is applied by raising hopper release as handle is turned. Abrasive sticks to cemented belt, excess drops off over end of pulley and may be returned to hopper. 5. When belt is completely coated, place pressure roller on belt. Revolve belt a few times. Remove belt and dry.

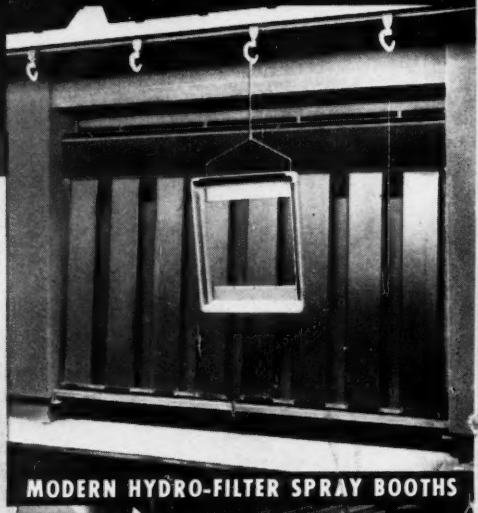
***FOR ADDITIONAL INFORMATION ON THE RAYON-RESIN POLISHING BELT, GRAINLOCK CEMENT OR THE SET-UP FIXTURE, ADDRESS ALL INQUIRIES TO:***

**INDUSTRIAL LUBRICANTS COMPANY Incorporated**
14459 WILDEMERE, DETROIT 6, MICHIGAN

# COMPLET

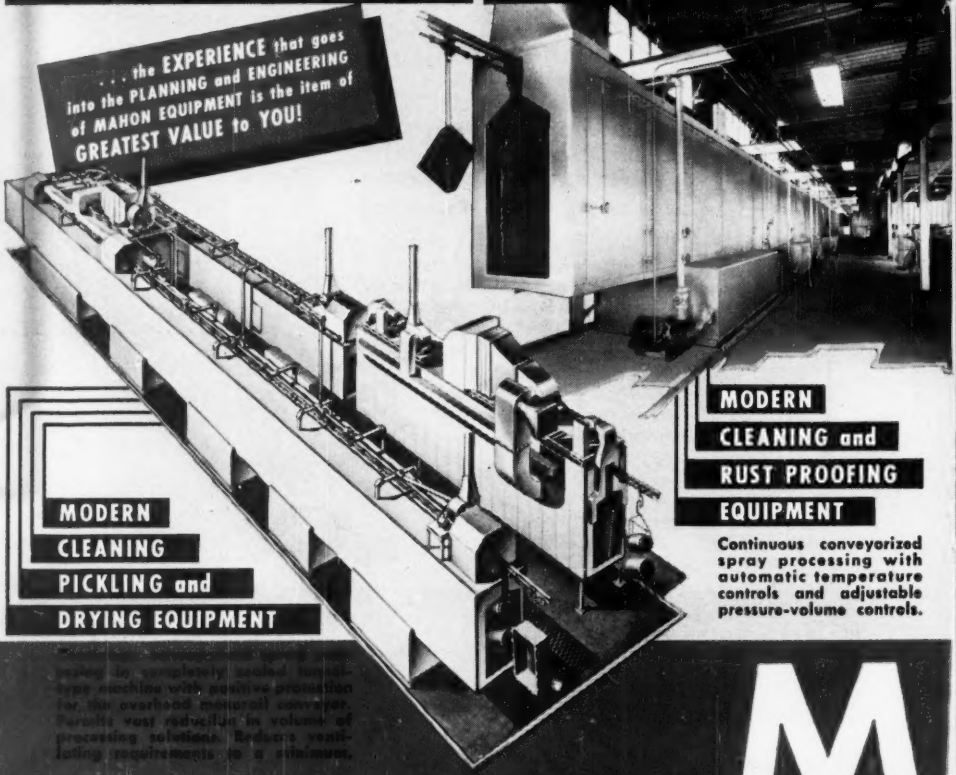


MODERN FLOW COATING MACHINES



MODERN HYDRO-FILTER SPRAY BOOTHS

. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!



MODERN
CLEANING and
RUST PROOFING
EQUIPMENT

Continuous conveyorized spray processing with automatic temperature controls and adjustable pressure-volume controls.

MODERN
CLEANING
PICKLING and
DRYING EQUIPMENT

M

# E Finishing SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH

**MAHON SELF-HOUSED FINISHING SYSTEMS** installed on roof or adjacent to plant

## *Modern Equipment Reduces Finishing Costs . . . Provides Better Working Conditions . . . Produces Finer, More Durable Finish!*

Modern technique in the processing of metal surfaces and the application of modern finishes requires modern equipment with positive control of each operation. Mahon Self-Housed Finishing Systems permit the freedom in planning essential to highly efficient equipment of this type. All restrictions imposed by plant layout are eliminated . . . hence, no compromises are engineered into these finishing systems . . . proper coordination and precise control of each phase of the finishing process is assured. No matter what your product may be, the Mahon organization is prepared to produce a complete finishing system that will save you money, provide better working conditions, and improve the quality of the finish on your product. If you are contemplating new equipment, remember that the Mahon organization has pioneered development of this highly specialized field for over thirty years . . . broad experience in every industry where finishing constitutes a major production operation, plus constant research and experimentation, has endowed Mahon engineers with a wealth of technical knowledge and practical know-how not available to you elsewhere. See Mahon's Insert in Sweet's Mechanical Industries File, or write for Catalog A-649.

**THE R. C. MAHON COMPANY**

HOME OFFICE and PLANT, Detroit 11, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems—including Pickling Equipment, Metal Cleaning and Rust Proofing Equipment, Dry-Off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Systems, and Drying and Baking Ovens. Also Core Ovens, Hydro-Foam Dust Collectors, and many other Units of Special Production Equipment.

# AHON

# PRACTICAL APPLICATIONS *of Modern Products*

## Conveyor System Speeds Cleaning, Spray Finishing, and Assembling of Cooling Fans

THE cleaning, finishing, and assembling of cooling fans by the Ilg Electric Ventilating Company at its Chicago plant are effected quickly and easily by the use of an improved conveyor system which carries the parts through the various stages of the manufacturing process.

All grease and dirt are removed from the parts as they pass through a large Howard metal washing and preparation machine, as shown in Fig. 1. The machine is divided into three six-foot chambers—one for washing, one for rinsing, and one for drying the parts. Fabricated fan parts are placed

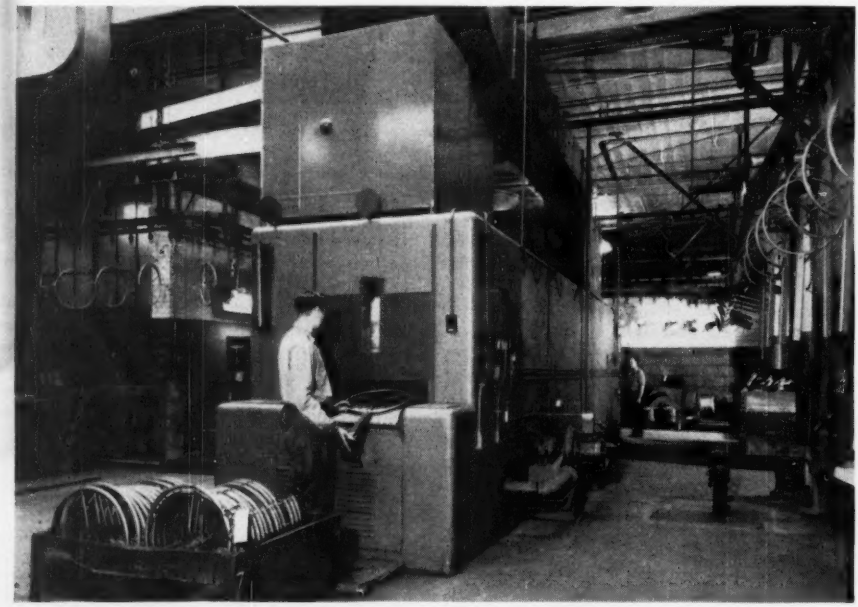


Fig. 1—Fan frames being cleansed of grease and dirt as they pass through a large Howard metal washing and preparation machine. The frames enter the machine at the far end and travel on an endless-belt conveyor through the machine to the discharge end, shown in the foreground.

Bewitching

. . . and there is something else that has a fascinating effect. A distinctive finish developed by our Creative Studio.

Such a coating can give new life and charm to your merchandise . . . it can bring out to the fullest the richness and styling of your diligent efforts.

Let us work hand-in-hand with you to produce a finish that will help do a real sales-winning job. Our creative service is available to reputable firms at no cost or obligation.

*No Tampering with Quality*

ROCKFORD VARNISH Company
ROCKFORD, ILLINOIS

*Manufacturers of Protective and Decorative Coatings*

*Affiliate*
GORDON BARTELS CO.
*Roller Coating Specialists*

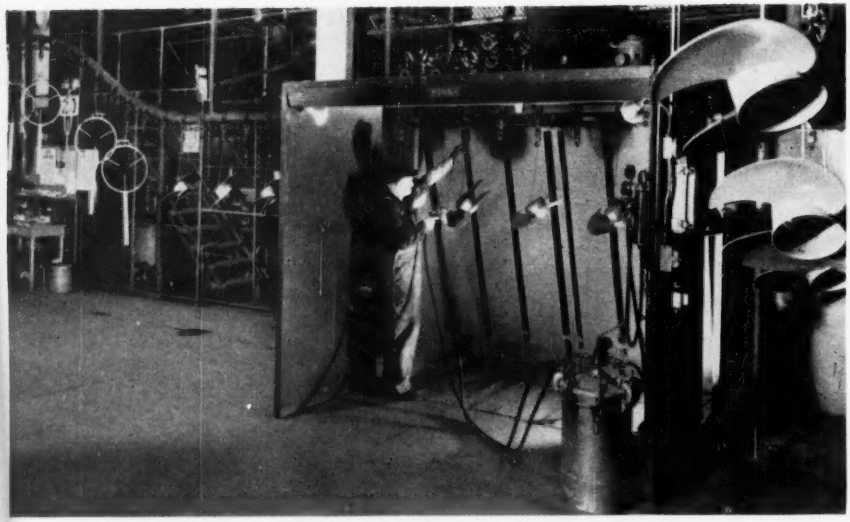


Fig. 2—Fan wheels being painted while passing through a Binks spray painting booth. (*Photos courtesy Ilg Electric Ventilating Company*)

on an endless-belt conveyor at one end of the machine where they are subjected to blasts from above and below of a solution of Chemco Phoscote M at a temperature of 175 deg. F. The solution removes oil and grease, and forms a protective phosphate coating on the metal, thus providing a surface to which paint will adhere. The parts are then spray rinsed with water at a temperature of 175 deg. F. They are dried with blasts of hot air and discharged at the unloading end of the machine into the hands of the operator, as shown in Fig. 1, after which they are placed into skid boxes and taken to the paint conveyor line.

The overhead paint conveyor system passes through a Binks spray painting booth, shown in Fig. 2, where the parts are painted with Pittsburgh Eye Rest Green Hammerhide Finish No. ML27754 thinned with Pittsburgh Thinner No. FL11834 to obtain a viscosity of approximately 12 to 14 seconds as measured with a Zahn No. 3 cup. The painting is accomplished with a spray pressure of 15 p.s.i. on the paint, and a 35 p.s.i. air pressure. The painted fan wheels in the right foreground of Fig. 2 circle slowly until they reach the conveyor section at the left. During this period, the paint air dries perfectly.

On the assembly line, the wheel is first placed on the motor shaft, after which the motor is assembled on the fan frame. The guard is then mounted on the frame, and the complete unit is placed on bar arm supports. The units move from the assembling room to the shipping department where each fan is packed separately.

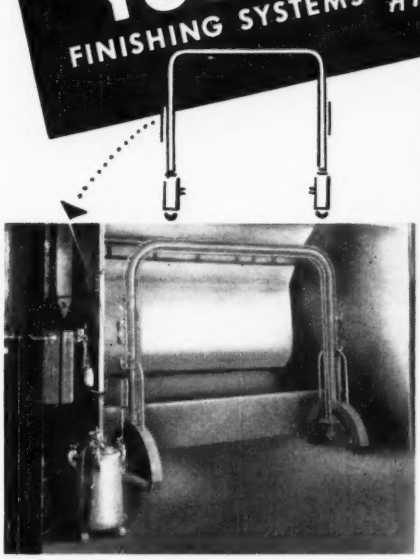
---

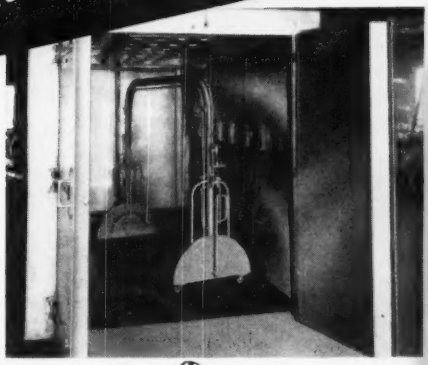
**Plating Anodes.** A 12-page booklet describing M-Sterling Chill-Formed copper anodes, electrodeposited copper anodes, lead anodes, and anodes of zinc, tin, brass, and cadmium can be obtained from the Federated Metals Div., American Smelting & Refining Co., 120 Broadway, New York 5, N. Y. Shapes and dimensions of the various forms available are illustrated.

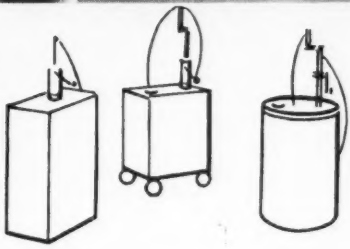
## When space means $

# YOUNG & BERTKE

FINISHING SYSTEMS ARE BETTER FOR YOU







**THE FINISHING SYSTEM AT THE PHILLIPS PUMP AND TANK CO.** is designed for finishing a variety of objects from a portable carwasher (shown in process of finishing) to pumps and tanks used in service stations. Storage space in this plant is limited. Material has to move quickly from the assembly line through the finishing department to the shipping room. Young and Bertke engineers designed and installed a spray booth and oven that required a minimum of room and facilitated the movement of materials. In installing a finishing system in your plant, let Young and Bertke engineers design it so that *you* will save both time and money. Write us today.

The YOUNG BERTKE Co.

**1126 BUCK STREET** **CINCINNATI, OHIO**

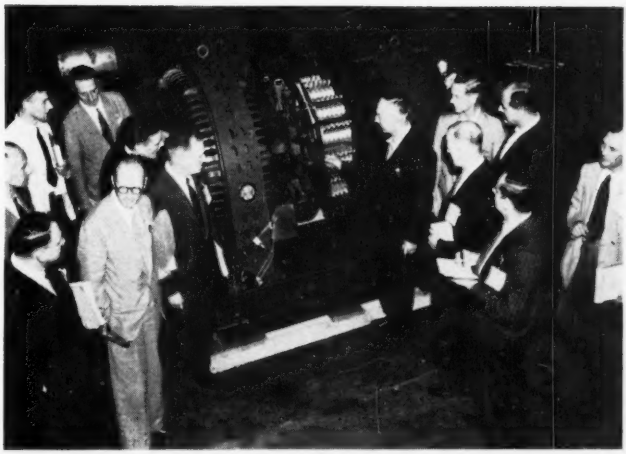
# NEWS of the Industry

The **ANGLO-AMERICAN COUNCIL ON PRODUCTIVITY,** established in October 1948 on the initiation of Sir Stafford Cripps, the British Chancellor of the Exchequer, and Paul Hoffman, Economic Cooperation Administration chief, consists of representatives from management and labor for the United States and the United Kingdom. It has as its sole objective the recommending and taking of such measures as may increase the level of productivity in British industry. In support of its view that productivity in the United Kingdom could be improved by familiarizing British producers with American "know how" and technique, the Council made arrangements for a series of visits to American factories by specialist teams composed of British employees from various levels of activity. The Council does not regard this project as a "one way street" since the visitors impart as well as receive knowledge, and American industry may thus benefit from British experience and practice.

Typical of the teams which have already visited the United States is the **U. K. SPECIALIST TEAM NO. 5,** which has just completed a six-weeks' tour of industries in the finishing field in New York, Philadelphia, Youngstown, Cleveland, Grand Rapids, Detroit, and New England. Members of the team are as follows: Team Leader, **J. N. T. ADCOCK,** assistant development manager, I. C. I. Ltd. (Paints Division); Deputy Team Leader, **N. A. TOPE,** technical director, Montgomery Plating Company, Ltd.; Team Secretary, **R. A. F. HAMMOND,** principal scientific officer on electrodeposition research, Ministry of Supply; **A. J. D. LINES,** assistant works manager, Lines Bros., Ltd.; **FRED WILLETTS,** chief metallurgist, W. & T. Avery, Ltd.; **E. C. J. MARSH,** chief chemist and metallurgist, Standard Telephones & Cables, Ltd.; **BERNARD TURNER,** works chemist, Monochrome Ltd.; **M. F. E. FRY,** process engineer, Joseph Lucas Ltd.; **L. J. C. CONNELL,** physicist, General Electric Company,

Group photograph taken in front of new Hanson-Van Winkle-Munning laboratory and administration building. Reading from left to right: Maurice Fry, Bernard Turner, Leslie Connell, Arthur Lines, Fred Willetts, Walter Ehrlinger (Export Mgr., H-VW-M), John Adcock, D. G. Foulke (Chief Chemist, H-VW-M), George Woodall, Ernest Marsh, Louis M. Hague (H-VW-M President), Victor Long, Myron Diggin (Technical Director, H-VW-M), Roy Hammond, Norman Watts, Frederick Champion, John Neubauer (President, Local AFL Union), George B. Hogaboom (Consultant), John Botts (Personnel Director), Norman Tope, Julius Demeter (ECA Project Manager).

*(Photo courtesy Hanson-Van Winkle-Munning Co., Matawan, N. J.)*



P. R. Lyons (center), manager of Electrical Sales, demonstrating equaload brush and insulated brush holder features of H-VW-M low-voltage generators. *(Photo courtesy Hanson-Van Winkle-Munning Co., Matawan, N. J.)*

Ltd.; **G. H. WOODALL,** research chemist, W. Canning & Co. Ltd.; **N. R. WATTS,** research chemist, Glasso Paint Products, Ltd.; **DR. F. A. CHAMPION,** head of corrosion research, British Aluminum Company, Ltd.; and **VICTOR LONG,** branch secretary, National Union of General & Municipal Workers.

Economic Cooperation Adminisration Project Manager of the metal finishing team tour was **JULIUS DEMETER** of the ECA New York Field Office.

On August 24 Specialist Team No. 5 visited the **HANSON-VAN WINKLE-MUNNING COMPANY,** Matawan, N. J. After being welcomed by Louis M. Hague, president, the group spent the morning on a guided tour through the recently enlarged laboratory, the largest of its kind in the world. They were conducted by Myron Diggin, technical director, and D. G. Foulke, chief chemist. Here they saw a complete, modern, plating installation, up-to-date facilities for the analysis and control of electroplating solutions, and advanced equipment for research in electroplating.

The afternoon was devoted to a study of the manufacturing techniques of the business when the group toured the manufacturing plants of the company, escorted by John Boots, personnel director and member of the Factory Management Committee. Special attention was given to the study of the building of low-voltage motor generators described by Irving Gemmell, assistant manager of conveyor sales, and the production of finishing supplies such as plating anodes, chemicals, buffs, polishing compositions, and so on.

At the end of the day when asked what

Myron Diggin (right), H-V W-M Technical Director, is shown here describing the work of technicians in the analytical laboratory. *(Photo courtesy Hanson-Van Winkle-Munning Co., Matawan, N. J.)*

impressed them most, the group was unanimous in expressing amazement in the amount of free service given by American industry to customers in the way of laboratory and field service; also, the extent to which the plating industry goes in utilizing instrumentation and control equipment to ensure the uniformity of plating deposits.

On September 11 Specialist Team No. 5 visited the Detroit plants of **TERNSTEDT DIVISION, GMC**, to observe practices employed in the manufacture and finishing of automotive accessories with organic finishes or by the application of electroplated metals. Base metals concerned included steel, stainless steel, and zinc base die castings, so that a number of different finishing operations could be observed in the two plants visited. Representatives from General Motors Overseas Operations; Julius Demeter, ECA Project Manager; D. Chapman, ECA New York Field Office; J. C. Weed, service and truck editor of "Automotive News;" and Ezra A. Blount, editor of PRODUCTS FINISHING, made the tour of the Ternstedt plants with the British finishers.

Upon arrival at Ternstedt the group was warmly welcomed by J. L. Conlon, general manager, Ternstedt Division, who introduced a number of Ternstedt executives to the group. These included George H. Holthaus, division comptroller; Hugo M. Rissman, Detroit plant manager; W. R. Reyhle, Ternstedt production manager; Leo R. Schreiner, Trenton plant manager; Paul L. Jones, Columbus plant manager; W. M. Daley, director of purchases; and C. F. Nixon, Director of Process Engineering.

The group was briefed on Ternstedt finishing practices by Mr. Nixon and Guy M. Cole, who supervised the plant tours. Activities of the group while in the Ternstedt plants were coordinated by Webb E. Lee, industrial relations manager.

The visitors from England were guests of the Ternstedt Division for lunch in one of the plant dining rooms, as indicated in the accompanying illustrations. The Ternstedt Division was also host at a dinner in honor of the visitors.

Other plants visited by the U. K. Specialist Team No. 5 between the dates of August 17 and September 29 were as follows: **MAAS & WALDSTEIN COMPANY, PHILLIP SIEVERING, INC., H. S. PRODUCTS FINISHING, L. HOFFMAN & COMPANY, WESTERN ELECTRIC COMPANY, PHILCO CORPORATION REFRIGERATION PLANT, ACF-BRILL MOTORS COMPANY, YOUNGSTOWN SHEET & TUBE COMPANY, STANDARD STEEL SPRING**

Members of U. K. Specialist Team No. 5, ECA representatives, and Ternstedt executives photographed in dining room of Ternstedt Detroit plant. *(PRODUCTS FINISHING Staff Photos)*

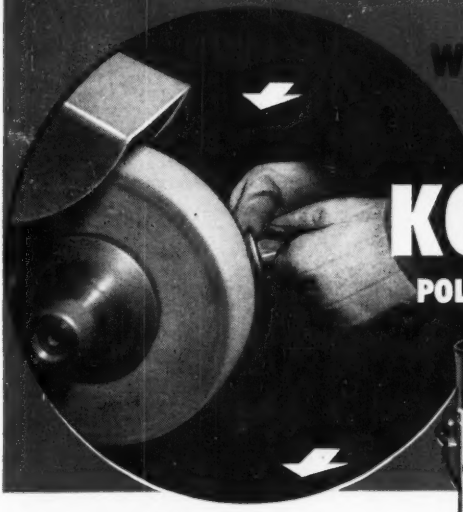
# Wheels CUT FASTER, LAST LONGER

When treated with

Park

# KOLD-GRIP

POLISHING WHEEL CEMENT



KOLD-GRIP Polishing Wheel Cement, laboratory-controlled through every step of production, will arrive at your plant *ready for use!* Viscosity is constant, regardless of normal temperature variations and the cement can be applied directly from the container . . . *without mixing or heating.* Kold-Grip is clean, odorless and very easy to handle.

Coarse or fine-grain abrasives set up right for fast cutting efficiency. Substantial savings are effected through longer over-all wheel life, fewer set-ups and reduced wheel inventory.

Wheels dry rapidly, are unaffected by humidity changes, and may be stored in any convenient plant area.

Let our polishing engineer demonstrate Kold-Grip for you, or send for free sample, telling us the metal to be polished, grain sizes to be used, and drying facilities available. We can help you if we hear from you.

Park

CHEMICAL COMPANY
8074 Military
Detroit 4, Mich.

Members of U. K. Specialist Team No. 5 and Ternstedt executives. Shown above (seated left to right) are D. Chapman (ECA), M. F. E. Fry, N. A. Tope, R. A. F. Hammond, J. N. C. Adcock (Team Leader), J. L. Conlon (Ternstedt general manager), B. Turner, F. A. Willetts, C. F. Nixon (Ternstedt), G. H. Holthaus (Ternstedt). Standing left to right, J. B. Donnelly (Ternstedt), Leo R. Schreiner (Ternstedt), A. J. De Sana (Ternstedt), Paul L. Jones (Ternstedt), E. Johnson (Ternstedt), Julius Demeter (ECA), L. J. C. Connell, Dr. F. A. Champion, A. J. D. Lines, J. H. Lindsay (Ternstedt), G. H. Woodall, H. W. Becker (General Motors Overseas Operations), N. R. Watts, A. Forberg (General Motors Overseas Operations), E. C. J. Marsh, W. B. Reyhle (Ternstedt), J. C. Weed ("Automotive News"), Hugo M. Rissman (Ternstedt), G. L. Marsh (Ternstedt), W. E. Lee (Ternstedt), G. T. Larson (Ternstedt), Dr. P. B. Rastello (Ternstedt).
*(PRODUCTS FINISHING Staff Photo)*

**COMPANY, DOEHLER-JARVIS CORPORATION, A. C. SPARK PLUG DIV., GMC., BRIGGS MANUFACTURING COMPANY, R. C. MAHON COMPANY, WESTINGHOUSE ELECTRIC & MFG. COMPANY, CLEVELAND GRAPHITE BRONZE COMPANY, INDIAN MOTORCYCLE COMPANY, ELECTROCHEMICAL INDUSTRIES, INC., SCOVILL MANUFACTURING COMPANY,** and **NUTMEG CHROME CORPORATION.**

## NEW PLANTS

Plans for the construction of two adjoining buildings for warehouses and sales office space in Atlanta, Georgia, have been announced by the **MINNESOTA MINING & MANUFACTURING CO.,** St. Paul Minn. According to C. P. Pesek, vice president in charge of engineering, both units are expected to be ready for occupancy about January 1.

The one-story structures will have a total floor area of 12,500 square feet. They will be located on Piedmont Road north of Metal Road, will be of steel and masonry construction, and will be served by the Seaboard Airline Railway.

The accompanying illustrations picture some of the facilities available in the new Detroit headquarters of **UNITED CHROMIUM, INC.,** located at 1700 East Nine Mile Road, Ferndale Station, Detroit 20, Michigan. Included in the new building, a view of which is shown in Fig. 1, are sales offices, research and analytical laboratories of the company's Electroplating Division, and a pilot plant, views of which are shown in Figs. 2, 3, and 4, in which actual production tests may be made in connection with various plating processes. The new 120 x 142-foot building also contains shipping and storage facilities and a special chemical mixing section.

Research laboratories have been established on the unit principle with a separate laboratory provided for each distinct research function. The new facilities include six separate laboratories, as well as a special photography department equipped with a metallographic microscope and camera, in addition to developing, printing, and enlarging apparatus. An extensive reference library assists the researcher in keeping abreast of world-wide developments in electroplating and allied fields.

The pilot plating plant contains over 50 tanks and occupies a space of over 2700 square feet. Electroplating processes

**One Lacquer, so clear it's invisible,**

**with multiple protection for . . .**

**Dulac Clear Universal Lacquer #462**

● Here's an M&W finish that permits accurate retention of all desirable surface qualities of most metals . . . that adds lasting protection against heat, cold, weather, corrosion, stain and perspiration — Dulac Clear Universal Lacquer #462. It's formulated to give good adhesion with either the spray, dip or brush method. And it fits into fast production schedules because in five to ten minutes this successful general purpose lacquer dries out of dust . . . hardens in one hour. For complete information, write for Technical Data Bulletin 110 or let an M&W technical consultant discuss your requirements privately with you.

PIONEERS IN PROTECTION
M&WCo 1876

*. . . where industry goes with finishing problems*

**MAAS & WALDSTEIN COMPANY**

Newark 4, N. J. • Chicago 12, Ill. • Los Angeles 34, Calif.

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MANUFACTURERS OF INDUSTRIAL FINISHES

# BETTER SPRAYED FINISHES

## AT LOWER COST TO YOU...

### *because we insist on the best gun materials*

Today, most all finishing departments are put to a grueling production pace—that means rough, reckless handling of equipment. Furthermore, the long-wearing finishes being spray applied today are not only tough themselves but are even tougher on the guns that handle them. Solvents are often quick to attack packings, hose, valve seats and even the metal too. Pigments and other solids in many present day finishes are highly abrasive and quickly wear away precision parts in ordinary spray guns.

Experience over the years with practically every known finishing material led DeVilbiss into the problem of combating wear and corrosion when spray guns first came into their own. Ever since, experimentation and research by DeVilbiss engineers have brought about a constant series of improvement through the use of newly developed alloys and other materials. As a result, DeVilbiss has developed equipment which is certain to give longest possible service with all the other highly desirable advantages of light weight, precision uniformity and high productivity with minimum maintenance. For example DeVilbiss drop-forged aluminum alloy gun bodies have extreme resistance to breakage besides reducing weight to minimize operator fatigue and give better maneuverability. Special non-corroding,

# DE VILBISS

wear-resisting materials used in fluid needles and tips combine with non-ferrous air caps to produce truly fine finishes for longer periods of service with reduced waste of materials and rejects.

For all finishing jobs, DeVilbiss equipment is matched to work best together, engineered to give you maximum value, maximum efficiency, lowest finish costs. Let the DeVilbiss engineers advise you . . . let us send you literature.

**THE DEVILBISS COMPANY**

WINDSOR, ONT. • **TOLEDO 1, OHIO** • LONDON, ENGLAND
SANTA CLARA, CALIFORNIA
Sales offices in all principal cities

***means* Quality *in all four . .***

**SPRAY EQUIPMENT**
**EXHAUST SYSTEMS**
**AIR COMPRESSORS**
**HOSE & CONNECTIONS**

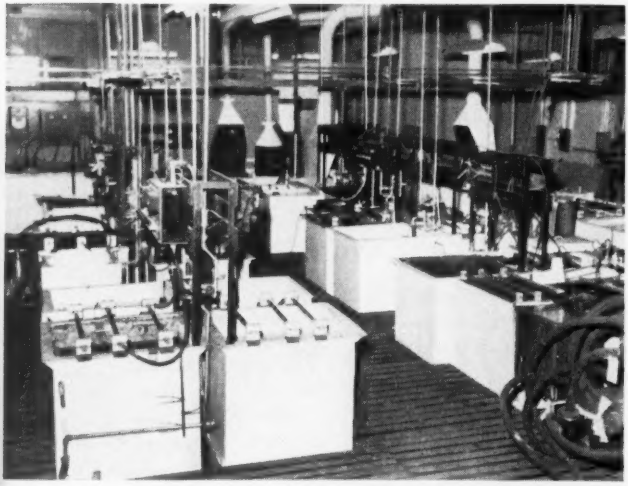


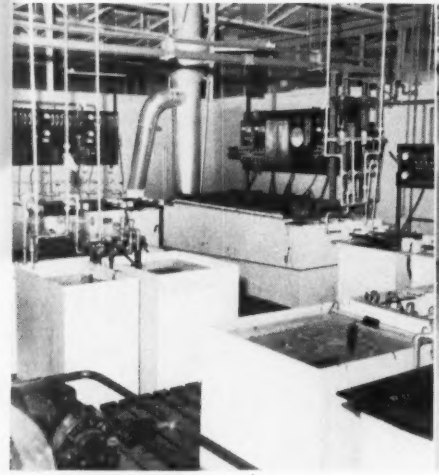
Fig. 1 (above)—Exterior view of the new United Chromium laboratory.

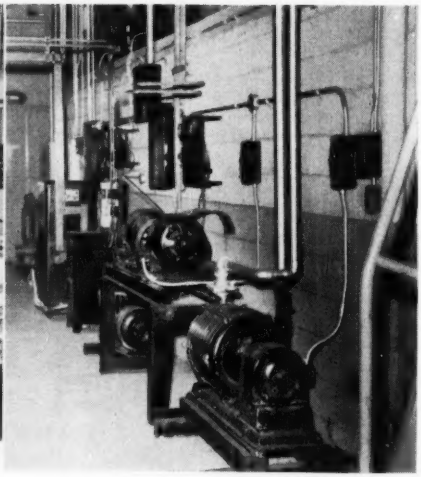
Fig. 2 (left) — An overall view of the pilot plant showing the well designed plating installation. Tanks are coated with Ucilon chemical resisting protective coating. Lighting and exhaust facilities are more than adequate.

Fig. 3 (below left)—In this corner of the pilot plant facilities are provided for chromium plating.

Fig. 4 (below right)—Power sources for plating operations in the pilot plant are located along an inner wall of the building across an aisle from the plating plant proper.

*(PRODUCTS FINISHING Staff Photos)*





# THE *Balanced* SOLVENT...

FOR ALL JOBS

# BLACOSOLV

FOR ALL METALS OR COMBINATION OF METALS

ONE PRICE
ONE SOLVENT IS ALL YOU NEED

**Blakeslee SOLVENT VAPOR DEGREASERS** are more economical more efficient—USE LESS SOLVENT

**NIAGARA**
**Metal Parts Washers** for use with cleaning compounds on either batch or production jobs.

**HIGHEST STABILIZED DEGREASING SOLVENT—NOT ALKALIZED!**

BLACOSOLV contains the finest and toughest stabilizers to prevent solvent breakdown. You need not pay premium prices for special solvents for different metals. Blacosolv can be used over and over, under the most rigorous conditions, without impairing its high qualities.

**G. S. BLAKESLEE & CO.**

1844 S. 52nd Avenue • Chicago 50, Illinois
New York, N. Y. Toronto, Ont.

which can be studied under actual conditions in this plating plant include acid, cyanide, and pyrophosphate copper, several kinds of nickel, conventional chromic acid-sulfate chromium, barrel and still tank S.R.H.S. chromium, cadmium, zinc, gold, silver, rhodium, tin, lead, Patternplate, and Electrocolor.

---

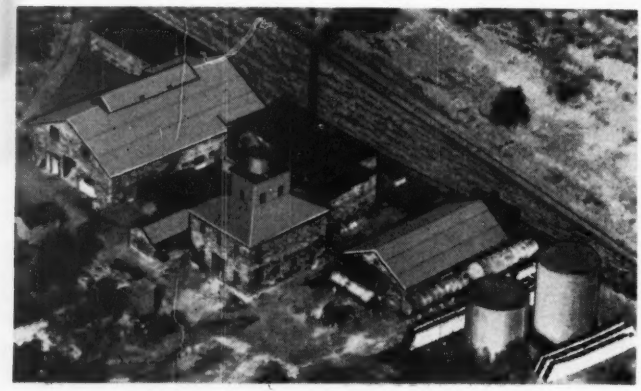
A new plant and modern installation have been completed by the **MANUFACTURERS PLATING CORPORATION** at 5075 Fourteenth Street, Detroit. The move to a larger plant made possible the introduction of streamlined equipment which includes a conveyor system, together with separate polishing and buffing sections.

The firm plates steel stampings and brass and zinc die castings on separate plating lines. At present, copper, nickel, and chrome plating is done for the automotive, accessories, and refrigerator industries.

---

**HOUGHTON LABORATORIES, INC.**, manufacturer of protective coatings for the chemical, petroleum, plating and general industrial fields, has purchased a plant at Smethport, Pennsylvania. Formerly the property of Susqehanna Chemical Company, this plant will be used for the production of the Hysol series of protective coatings, according to Russell M. Houghton, president.

With three main buildings on a 17-acre tract, the plant has 20,000 square feet of floor space and a 350,000 gallon liquid storage capacity.



New plant of Houghton Laboratories, Inc.

**THE RINSHED-MASON COMPANY** of Detroit, Michigan, has purchased the former Caltone plant, located on a four-acre site at 1440 N. Lemon St., Anaheim, Calif., it was announced by R-M president, Frederick G. Weed. The property will immediately be converted to the manufacturing and warehousing of automotive and industrial finishes, automotive refinishing materials, and allied products. Headquarters will continue at Detroit, where the company's products are now being manufactured and sold nationally under the trade name, R-M.

Rinshed-Mason was established in the Motor City in 1919, and today is recognized as one of the principal manufacturers of automotive and industrial finishes in the country. The Detroit operation is located on a seven-acre tract consisting of 34 building units, housing office, laboratory and manufacturing facilities for lacquers, enamels, undercoats, varnishes and other finish products.

General manager of the company's new Western Division will be Edward S. Hawkins, now director of automotive finishes at Detroit.

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**McDOUGALL - BUTLER COMPANY INC.**, manufacturer of paints, varnishes, and enamels, has announced that it has vacated its Evans Street property and is now located at its new plant, 2929 Main Street, Buffalo.

---

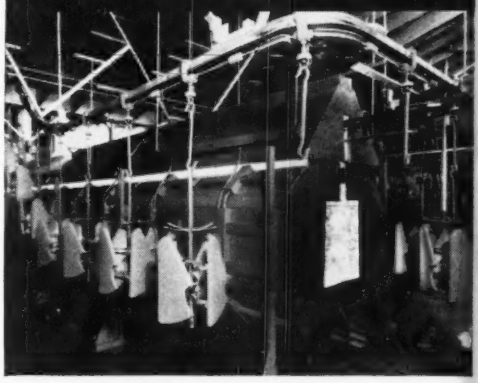
Max C. Jones, president of the **MICHIGAN ABRASIVE COMPANY**, has announced the purchase of the former Michigan Tool Company plant at Eight Mile Road and Groesbeck Highway, Detroit, which was constructed in 1942. It contains approximately 65,000 square feet of floor space and is located on ten acres of ground.

## Use INFRA-RED *Evenray* for

# Substantial Savings

## on Finish Baking

**• Over 6,000 Plants Cut Time and Costs by Using Fostoria Evenray Systems**



Here is real proof of manufacturing economy with a Fostoria Infra-red Evenray System: Before using Evenray, the Friden Calculating Machine Co., of San Leandro, Calif., operated their 3 convection ovens 20 hours per day, 5 days a week to obtain required finish baking production. Now, a 44 ft. Evenray oven with connected load of 90 KW turns out more production of better quality in only 7 hours per week — a savings of 93 hours. The weekly power bill for this Evenray System is only $12.60, based on a 2c per KW rate, which is extremely low compared to their previous operating cost with convection ovens.

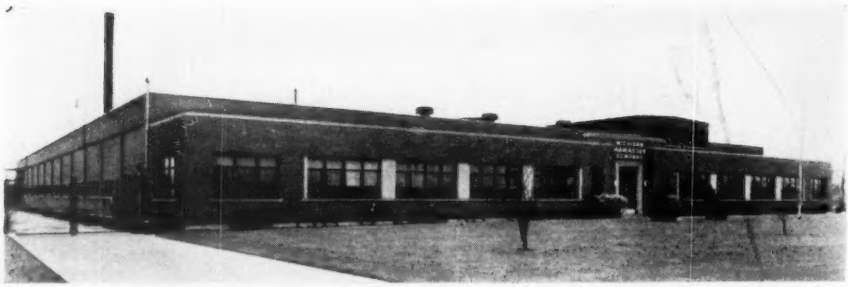
The substantial cost savings with the Evenray System at Friden Calculating Machine Co., pictured above, is typical of the results obtained with Fostoria equipment by over 6,000 plants. You can save, too. A Fostoria engineer will gladly analyze and forecast accurately the benefits of Infra-red for your specific use.

**— GET THE FACTS**

*Technical information and descriptive literature are available on request. WRITE NOW. Learn how EVENRAY can lower your production costs.*

**THE FOSTORIA PRESSED STEEL CORP.**
**FOSTORIA, OHIO**
**Oldest and Largest Manufacturers of Industrial Infra-red Ovens**

EVENRAY SYSTEM
fostoria
FOR BAKING • DRYING • PREHEATING • DEHYDRATING
Trade Mark Reg. U. S. Pat. Off.



Newly acquired plant of Michigan Abrasive Company

The company will also continue to occupy its present plant at 1111 Bellevue Avenue, where it started business in 1942.

The plant will be equipped with specially engineered machinery, and the newly developed resin coated abrasives will be made together with an expanded line of products, making available greater widths and more varied constructions.

## COMPANIES

**FINE ORGANICS, INC.**, announces its intention to enter the industrial and motor fleet market. To do this, the Aviation Chemicals Division has been broadened in scope and will become the Aviation-Industrial Division, continuing under the direction of John B. Moore, who has been appointed general sales manager of Aviation and Industrial Chemical Sales.

The company announces the appointment of Arthur K. Meyer Company as representative in Los Angeles County. Sales offices are now located at 1206 South Maple Avenue, Los Angeles 15.

Charles H. Cadiz, formerly superintendent of maintenance of TACA Airways, has joined the company as Southern sales representative of both Aviation and Industrial lines. He will base at New Orleans, Louisiana.

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This year marks the fiftieth anniversary of the **NIAGARA ALKALI CO.**, New York, N. Y., J. Clarke Cassidy, president, has announced.

Organized in 1900, under the name of the Roberts Chemical Company, Niagara has pioneered steadily in its field of electrochemistry, specifically in relation to chlorine and similar products.

A notable contribution of the company has been the development of the first successful apparatus for chlorination of water supplies. In addition, the company has a number of other firsts to its credit in this country. Principal of these is the successful introduction of liquid chlorine for bleaching cotton textiles. Former bleaching methods weakened the cloth. The company likewise was the first to manufacture synthetic caustic potash in the United States.

Most recent addition to the company's list of chemicals, while not new, is trichlorethylene of high stability, largely used in metal cleaning and degreasing.

Principal officers of Niagara Alkali besides Mr. Cassidy are S. Willard Jacobs, vice president; Stephen J. White, vice president and treasurer; and William J. Weed, manager of sales.

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Savings in labor and material costs are being achieved by a growing number of metal product manufacturers through the application of synthetic enamels at elevated temperatures, usually around 160 deg. Fahrenheit.

According to C. W. Blacketer, technical director of the **ATLAS POWDER COMPANY'S INDUSTRIAL FINISHES DEPARTMENT** at Stamford, Connecticut, these new enamels can be heated with any of the commercial paint heaters on the market and applied with standard-type spray guns. The finish is reduced to spray viscosity by heat instead of thinner which permits the finisher to eliminate or substantially lower the expenditure formerly made for thinner.

With the higher percentage of film-forming solids, a heavier film is deposited

When it comes to specifying a rust-resisting or friction-reducing chemical finish for a production run of steel parts, whatever they may be, there are many advantages to selecting Du-Lite, particularly if you want to avoid trouble and keep production up to schedule.

Du-Lite produces on all steel and steel alloy parts except stainless a handsome, uniform jet black finish. Not a coating, Du-Lite becomes an integral part of the steel surface itself and will not chip, peel, crack or blister.

Imposed at non-critical temperature, Du-Lite causes no dimensional change in the parts treated. The process is simple to operate and inexpensive to install.

To guarantee the success of every Du-Lite installation there is available a trained, technical representative in your area who will get you started and find the "workable" answers to every problem that arises.

DO IT RIGHT WITH DU-LITE

While matching or excelling in every respect any other process for the chemical blacking of steel, Du-Lite remains less costly to operate than most. Do it right with Du-Lite. . . . . write or phone today.

WRITE or PHONE TODAY to

## The DU-LITE CHEMICAL CORP.

100 RIVER ROAD -:- MIDDLETOWN, CONN.

on the surface, Mr. Blacketer pointed out. Thus, fewer coats are required than with enamels applied at room temperatures. Manufacturers, it is said, are also finding that hot enamels flow easier, giving a smoother surface with higher gloss.

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**THE HANSON-VAN WINKLE-MUNNING CO.**, Matawan, N. J., has announced that arrangements have been completed for its Anderson, Indiana plant to fabricate rolled copper anodes. Shipments can be made from stock in any reasonable quantity and size anode, assuring immediate delivery.

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Howard A. Acheson, president of **ACHESON COLLOIDS CORP.**, Port Huron, Mich., has announced the opening of headquarters of the Dispersed Pigments Division of the company at 420 Lexington Avenue, New York. This is a separate office from the Graphite Division of the company's New York office at 50 Church Street. Acheson service disperses pigments for paints, coatings, inks, textiles and other products.

The department headquarters and staff are headed by George Houston, recently appointed technical sales representative of the Dispersed Pigments division. He will act as technical liaison between the Acheson factory and the field.

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A formulating technique which eliminates the problem of "solvent wash" from baking finishes used on metal cabinets and similar metal articles has been developed by the Finishes Laboratories of **STANDARD VARNISH WORKS**, 2600 Richmond Terrace, Staten Island 3, N. Y., it was announced by Carl Bauer, industrial sales manager.

The Standard process, coupled with any of the company's baking enamel formulations, will result in the elimination of rejections and refinishings attendant to solvent wash and its effects, it is claimed.

---

On September 25 the **PENNSYLVANIA SALT MANUFACTURING COMPANY** reached its 100th anniversary. Various events commemorating this


**Industry's 3 Newest**

**COLD STRIPPERS**

**Fast! Economical! Safe! New!**

**"UNISOL"**—for removing all baked enamels! Used cold—Non-inflammable—Non toxic—Strips baked enamels in seconds—Used for all type metals—Requires no rinse—Non-injurious to hands or clothing.

**"UNISOL No. 2"**—A new cold stripper for japans and vinyls—Non-inflammable—Strips tough japans and vinyls in matter of minutes—Used for all type metals.

**"STRIPPER 202"**—Something new for removing "stop-off" lacquers in seconds—Will not tarnish highly polished metal surfaces—Non-inflammable—Used cold—Non toxic.

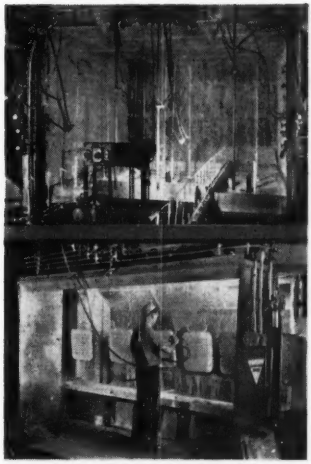
***Samples and further information supplied on request.***

**CHEMCO PRODUCTS CO., Inc.**

**7740 WEST 47TH STREET** **LYONS, ILLINOIS**

This DESPATCH
Equipped Company Reports...
DESPATCH 3-stage washer gives 1 min. alkali wash and two ½ min. hot water rinses. DESPATCH oven provides 5 min. dry-off at 350°F.

# *4 times the Production*
## WITH NO INCREASE IN OPERATING COST



Top: DESPATCH electrostatic spray booths apply the high quality Bunting finish.
Bottom: DESPATCH water wash manual spray booths are used for touch-up.

The Bunting Glider Co., Ardmore, Pa., states that 40 tons of Bunting metal furniture components are being cleaned and dried every 8 hours with a Despatch conveyorized 3-stage spray washer and dryoff oven. The new operation, which includes phosphatizing, replaces their vapor degreaser whose output was only 10 tons per 8-hour day.

**PAINT REJECTS AVERAGE ONLY 1%**—Two DESPATCH Spray Painting Systems applying the high quality Bunting finish have reduced rejects from the old method average of 4% to a new low of 1%. In addition, 4 times the production per man hours has been achieved by these two systems over former methods and equipment. Each paint system is conveyorized, and comprises two standard DESPATCH Water Wash Spray Booths and one DESPATCH Electrostatic Spray Booth.

### LET DESPATCH EQUIPMENT HELP YOU INCREASE PRODUCTION AND QUALITY

What DESPATCH Equipment has done for Bunting, it will do for you! DESPATCH installations are engineered to fit your particular needs. You can get a complete finishing system or individual units, such as—

- BAKING OVENS
- DRYOFF OVENS
- SPRAY BOOTHS
- AIR MAKEUP SYSTEMS
- CONVEYORS
- FLOW COATERS
- WASHERS

*WRITE TODAY for Bulletin 51C or request a representative to call*

Minneapolis Offices: 619 S. E. 8th Street. Chicago Office: 7070 No. Clark Street.

**DESPATCH OVEN COMPANY**

Pennsalt's Whitemarsh Research Laboratories, the former E. T. Stotesbury mansion in Chestnut Hill, near Philadelphia.

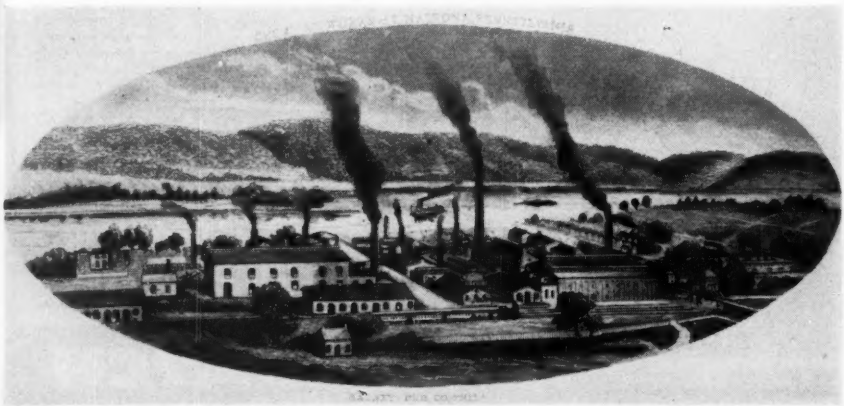
milestone were held at the Whitemarsh Research Laboratories at Chestnut Hill, near Philadelphia.

When the Company was organized in September 1850, there were only 51 persons employed in America's infant steel industry. Cast and wrought iron, brass, copper, and bronze, laboriously machined, finished and polished by hand, were the metals of our young industry. What chemicals were used in metal working were few and basic. Today the steel and aluminum industries are two of Pennsalt's largest customers and virtually every phase of America's vast metalworking industry is served by some product of this century-old chemical manufacturer.

Pennsalt was organized by five young Philadelphia Quakers to manufacture "the alcaline salts of soda." Since most of the Eastern Seaboard industries were importing what chemicals they used from Europe, the company founders chose the expanding Midwest for their market and built their first plant at its gateway—at Natrona on the Allegheny river near Pittsburgh.

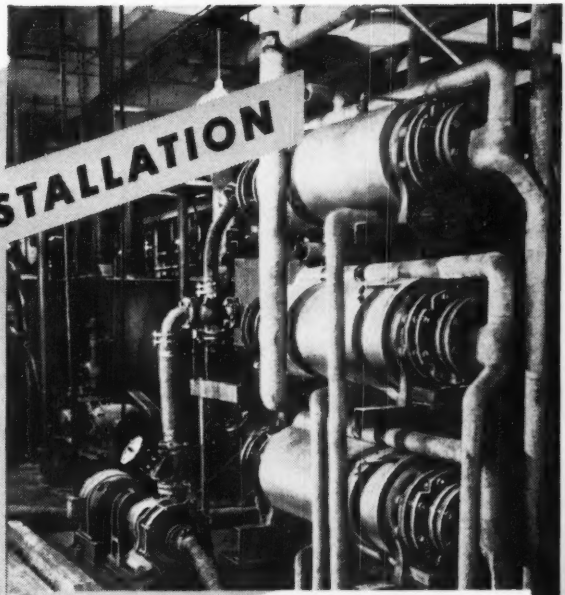
As the steel industry grew in the Pittsburgh area, Pennsalt began to supply it with chemicals—at first acids for pickling and later others. In 1864 Pennsalt began importing cryolite from Greenland as a source for soda alkalies and alum. A by-product was calcium fluoride, which the company sold to early steel makers as a flux.

Pennsalt also played an important part in one of America's most exciting industrial developments. Charles Martin Hall,



Pennsalt's first plant at Natrona, near Pittsburgh, Pennsylvania, according to a steel engraving made in 1872.

# HOW THIS PLATING INSTALLATION IS FORTIFIED AGAINST CORROSION



One of five Durco plating equipment arrangements handling bright nickel plating solution at the Daystrom Corporation plant, Olean, N. Y. The fifteen Durco heat exchangers, operating on 70 psi steam, raise 40,000 gallons of the solution from 100° to 160° F in approximately eight hours.

Every vital part of this bright nickel plating set-up is permanently protected against corrosion. The heat exchangers, pump, valve and split-flanged fittings are all made of Duriron—the high silicon iron with almost perfect corrosion resistance.

Durco equipment can fortify your plating operation against corrosion-caused replacement costs. Write for details of complete plating set-ups or individual equipment units. Ask for Bulletin Folder S.

DURCO
CORROSION RESISTING ALLOYS & EQUIPMENT

DURCO Adv. 31-GM

**THE DURIRON COMPANY, INC.**
DAYTON 1, OHIO
Branch Offices in Principal Cities

in 1886, discovered that Pennsalt's cryolite was, in its molten state, the electrolyte for reduction of aluminum. The new use for the Greenland ore quickly over-shadowed all others and today it plays an essential part in our aluminum production.

George B. Beitzel, president, Pennsylvania Salt Mfg. Company.

In addition to supplying this to the Pittsburgh Reduction Company (later Alcoa), Pennsalt was in position to furnish alumina, from its recently acquired Bayer process, the first in America.

Hall's remarkable achievement greatly interested Pennsalt in the whole field of electrolytic chemistry, and it is interesting to note that the company's first experiments in this field were in refining copper and other metals. It was this work which eventually led the company into electrolysis of brine to produce caustic soda, chlorine and hydrogen at a new plant at Wyandotte, Michigan.

The few uses for chlorine in the early 1900's definitely limited caustic soda production. Pennsalt's first large chlorine customer was the Goldschmidt Detinning Company (later Metal & Thermit Corporation), who used quantities to recover tin from scrap.

Throughout its history Pennsalt had sought to sell its chemicals in as many different industries as possible. But in 1928 Leonard T. Beale, then president of the company, called for an active diversification program, seeking new products for more fields through research and acquisition of patents and plants.

A notable result of the research part of this program was the successful production in 1935 of anhydrous sodium orthosilicate as a metal cleaner. Quickly proving itself, this product launched Pennsalt in the production of chemical specialties for metal cleaning. Meanwhile, the diversification program added other products important to metal production, such as anhydrous ammonia for heat treating and hydrofluoric acid for stainless steel pickling.

As the use of orthosilicate cleaners expanded through the middle '30's, Pennsalt research developed several modifications and specialties based on the original product to meet a wide variety of needs. Among those actively interested in the program during this time were **GEORGE B. BEITZEL**, then sales manager and now Pennsalt president; **WILLIAM P. DRAKE**, now sales vice president; and **JOSEPH J. DUFFY, JR.**, now manager of the company's Special Chemicals Department.

One of the early uses for the orthosilicate cleaners was in the cleaning of sheet steel for tinplate in tin mill cleaning lines running at the rate of 150 feet per minute. Now a successor product is operating just as successfully on lines running 2,400 feet per minute.

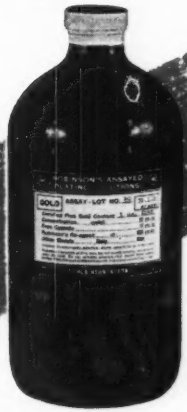
In 1939 the company formed the Pennsalt Cleaners sales department. With the addition of Pennsalt's corrosion-resistant cements and paints in 1941, this became the Special Chemicals Department.

Joseph J. Duffy, Jr. (left), sales manager of Pennsalt's Special Chemicals Department, consults with William P. Drake, vice president in charge of sales.

# ROBINSON'S *Assayed* GOLD PLATING SOLUTIONS and SALTS and PALLADIUM PLATING SOLUTION

**FULL RANGE of PRECIOUS METALS for PLATING for Industrial and Decorative Uses!**

## GOLD




Want a certain gold shade? Or a hard gold finish? Robinson will compound it, assay and file the formula—your assurance of constant results. Our Gold Solutions and Salts are precision laboratory products made from the finest ingredients. Troy or Avoirdupois. Send on your samples for us to match.

## PALLADIUM

Robinson's Palladium Plating Solution is thoroughly tested and proved—ideal for electronic, optical, scientific and a host of industrial and decorative uses. It deposits a lasting white finish that withstands salt spray, moisture and most all unusual atmospheric conditions. If you need such a finish be sure to see us first.

## RHODIUM

Robinson distributes the internationally known Johnson - Matthey Rhodium. A precious metal of the platinum group that deposits a long-lasting white finish over most metals.

*"If it's ROBINSON'S— that's your guarantee"*

**A. ROBINSON & SON**

"70 Years in Precious Metals"

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Please send information on Robinson's Assayed Gold Plating Solutions ☐ Potassium Gold Cyanide ☐ Rhodium Solutions ☐ Booklet "Precious Metal Plating" ☐

Name ..... Street .....

World War II greatly expanded production. With the war's end, Pennsalt resumed research and soon went into production of inhibited acid cleaners, such as PM-90, for descaling; emulsion cleaners, such as EC-10; maintenance cleaners, rust inhibitors, and many other products for the metal industry. One of the latest, recently announced, is Pennsalt AE-18, an aluminum etching compound.

Today Pennsalt's Special Chemicals Department handles more than 50 chemical specialities for the metal industry, including acid, alkaline and emulsion type cleaners; rust inhibitors; pickling and descaling compounds; maintenance cleaners, and corrosion resistant cements and paints. Research is adding more, not only in the field of cleaners but other chemicals for the metal industries.

In addition to the special chemicals work, of course, Pennsalt's Heavy Chemicals Department is supplying many products to the metal industries, such as hydrofluoric, muriatic, nitric and sulfuric acids; anyhydrous ammonia, caustic soda, cryolite, sal ammoniac and many other products.

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Equipment for the new Hot Spray Process will be exhibited at the **BEDE PRODUCTS, INC.** booth at The National Metal Show. James A. Bede, president, and Richard Estabrook, vice president of Bede Products, Inc., Cleveland 9, Ohio, and Harold Fornwall, Chicago representative, will be in attendance at Booth 2402.

The complete line of Bede Paint Heaters, including the Bede Standard Heater, Bede Circulating Heater, Dip Tank Heaters, and so on, will be exhibited, and complete information including samples of Hot Sprayed Finishes will be available.

NALCO
Infra-Red UNITS
Speed Industrial Drying, Baking and Heating
Engineered for production use, Nalco Infra-Red Lamps with long-lasting carbon filaments give less glare, more penetrating heat . . . assure completed jobs at a faster rate—and at a much lower cost.
From single units, strips and portable units to banks and ovens, Nalco Infra-Red Lamps and units can be "tailored" to speed up your production.
Write for "Drying Problems Made Easy"
NALCO INFRA-RED DRITHERM
NORTH AMERICAN Electric Lamp Co.
1020 TYLER ST.
ST. LOUIS 6, MO.


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**OAKITE PRODUCTS, INC.**, New York, manufacturer of specialized metal-cleaning and related materials, will feature recent additions to its line in Booth 322 at the National Metal Exposition, Chicago, October 23-27.

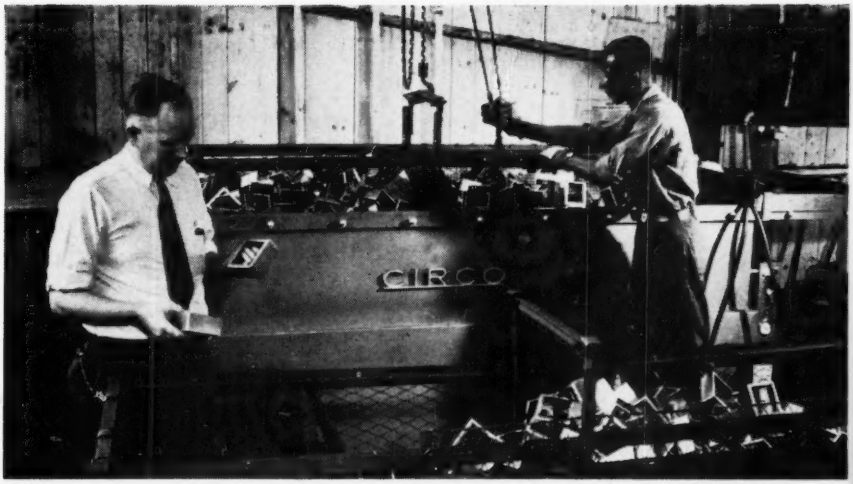
In keeping with the Exposition's "High Production" theme, the Oakite exhibit will direct special attention to a new prepaint cleaner, Oakite Compound No. 33, which effects important time savings in prepaint treatment of metal parts in tanks or by hand. For prepaint cleaning of metal parts by automatic washing machine, the Oakite CrysCoat Process will be highlighted. Other time and work-saving Oakite materials to which the exhibit will call attention include those for use in electrocleaning steel; electrocleaning brass and copper; pickling, deoxidizing, and bright dipping; barrel cleaning; burnishing; machining and grinding; rust prevention; and many other operations.

The Oakite booth will be staffed by F. P. McNally, Chicago division manager, assisted by main office engineers and metal specialists from the company's field service organization.

## NEW POSITIONS

Fred J. Gentile, president of the Bristol Lacquer and Chemical Company at Forestville, Connecticut, has announced the appointment of **DOUGLAS H. MOTT** to the post of technical director.

Mr. Mott is a graduate of Michigan State College and holds a B.S. degree in chemical engineering. During World War II he worked on the atom bomb project in Oak Ridge, Tennessee. Prior to his association with Bristol he was technical director for five years with the Tredennick Paint Manufacturing Company of Meriden, Connecticut. A prominent figure in the paint field, Mr. Mott was also




*Courtesy of Bud Radio, Inc.*

# Save—with Circo Vapor Degreasing

Circo vapor degreasing quickly and easily removes oil, grease and dirt from recesses and holes in even the most intricate parts. Circo degreasers handle all types of work—tiny screws or large iron castings—prior to finishing, inspection and assembly. High precision standards are safely met by Circo degreasers.

With a Circo degreaser, not only do you get better cleaning faster, but you are assured of operating economy. Its automatic control system holds solvent consumption to a minimum. Costly hand-labor operations are eliminated—savings of over 90% in time alone are common.

Send for our catalog of standard Circo degreasers. Our engineers will gladly work with you on unusual problems requiring equipment of special design. A-3302

**Cut costs 3 ways:**

1. Minimum solvent consumption.
2. Reduced man hours.
3. Better cleaning faster.

**CIRCO PRODUCTS COMPANY**
*Metal Cleaning Equipment*
6531 EUCLID AVE. • CLEVELAND, OHIO

**PIONEERS IN THE DEVELOPMENT OF HOT VAPOR CLEANING EQUIPMENT**

associated with the Devoe and Raynolds Paint Company and with several of the country's other leading paint manufacturers.

---

Announcement has been made by the Hanson-Van Winkle-Munning Co., Matawan, N. J., of the promotion of **ROBERT M. NORTON** to the post of sales manager. Mr. Norton had been assistant sales manager since 1948 after eight years as field representative in New England and New York.

Robert M. Norton

His responsibilities as sales manager will be to continue to direct the sales of electroplating and polishing supplies and, in addition, to assist John A. Bauer, vice president, with general administrative problems.

---

The appointment of **BENJAMIN SAMPSON** as general sales manager has been announced by K. H. Huppert, president of the K. H. Huppert Co., Chicago, Ill., manufacturer of electric laboratory and industrial furnaces and ovens.

Benjamin Sampson

Mr. Sampson was formerly district sales manager of the Stewart Division of the Sunbeam Corporation, and recently manager of the Industrial Furnace and Oven Division of Claud S. Gordon Company.

The Industrial Furnace Division of the K. H. Huppert Company will be largely expanded to provide for the increased demand for its special applications on industrial furnaces, ovens, and kilns.

**DONALD D. CLARK** has been added to the research staff of United Chromium, Incorporated, Detroit, Mich., where he will be engaged in electroplating research.

Donald D. Clark

Mr. Clark comes from Michigan State College where he acted as assistant to Dr. D. T. Ewing on the American Electroplaters' Society Project No. 5, "The Effects of Metal Impurities on the Physical Properties of Electrodeposited Nickel."

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G. A. Hutt, assistant to the president of Ferro Enamel Corporation, has announced the addition to the Michigan territory sales and service staff of **IVAN H. SHROLL.** Until recently Mr. Shroll was employed in the Midwest Division of Ferro in Chicago as a service engineer. Mr. Shroll will assist S. N. Smith, manager, Michigan territory.

Ivan H. Shroll

---

Sales assignments announced recently by The Carborundum Company include the appointments of **JOHN A. DECKER** as sales manager for the New York district and **WILLIAM J. KINGSLEY** as assistant sales manager of the Bonded Products and Grain Division, with headquarters in Niagara Falls, New York.

Mr. Decker, with the Company since 1933, held the position of assistant sales manager of the New York district prior to his present appointment. Mr. Kingsley, a veteran of 28 years' service with Carborundum, was previously a salesman working out of Syracuse and Boston.

# JETAL

A PROTECTING BLACK FINISH

Black!

Fast!

For

IRONS AND STEELS

On in Just 5 Minutes!

Easy to use . . . goes on by immersion bath (no current) JETAL gives more protection — greater wear resistance — consistent quality, added toughness, longer life!

JETAL will not chip, peel or crack off or dust off even if bent or cut.

JETAL costs less!

"JETALIZE" irons and steels in bulk, in baskets or in barrels.

For additional protection, after the JETAL process, apply JETOIL 1A, the all-around, oil-type after coating.

Get your iron or steel samples JETALIZED without cost . . . or ask for a JETAL demonstration in your plant.

ALROSE CHEMICAL CO.

*Originators of Black Oxide Finishes in The U.S.A.*

PROVIDENCE, RHODE ISLAND • GAspee 1-3000 • 1-3001

Other changes announced by the Company provide for the transfer of **THOMAS CURTISS**, a field sales representative in the Buffalo district, to the Central New York area. **EDGAR T. HARRIS** will replace Mr. Curtiss. **GEORGE DENNISON** was named a special sales engineering representative for the New York State, with headquarters in the Buffalo district office.

---

C. H. McAleer, president of Detroit Chemical Specialties, Inc., 9072 Livernois, Detroit 4, Mich., has announced that **RICHARD P. BLAKE**, formerly division manager of McAleer Manufacturing Co., Rochester, Mich., is now associated with Detroit Chemical Specialties, Inc. Mr. Blake has eight and a half years' plating experience, as well as technical training at General Motors Tech and Ohio State University.

---

**STEPHEN E. SESNICK** and **ERNEST N. FIELD** have been appointed technical sales representatives for Standard Varnish Works, New York, according to an announcement by Carl Bauer, industrial sales manager. Mr. Sesnick's activities will be concentrated in the New Jersey territory and Mr. Field's in Connecticut.

Stephen E. Sesnick (left), Ernest N. Field

Mr. Sesnick, a chemical engineer, and Mr. Field, a graduate of the University of Alabama and Wesleyan University, have both had broad experience in the sales and servicing of industrial finishes.

---

**MAURICE N. TRAINER**, first vice president of American Brake Shoe Company, was elected president of the company at the board of directors meeting held September 13. **WILLIAM B. GIVEN, JR.**, president for 21 years, was elected chairman of the board.

---

The Lowe Brothers Co., Dayton, Ohio, paint and varnish manufacturer, has announced the appointment of **EDWARD F. TEYBER** as manager of the newly created Industrial Division.

The Industrial Division is the result of a consolidation of the Industrial Trade Sales, Railway, and Central Industrial Departments. Industrial consumers will continue to be sold and serviced through the company's district offices located in Atlanta, Boston, Jersey City, Chicago, Kansas City and Dayton.

Mr. Teyber has been associated with Lowe Brothers for 30 years, and prior to his present appointment served as manager of the Central Industrial District.

Appointed to the position of sales manager of the Industrial Division is **J. B. WOODS**, formerly a Lowe Brothers industrial salesman in the Chicago area.


FOR SALE

85,000

AIR-COOLED BUFFS

(Slightly Used)

12" to 13" Diameter

1 ¼" Arbor

Samples Submitted

DETROIT 12, MICHIGAN

MICHIGAN BUFF CO., INC.

3500 GAYLORD AVENUE

## PROVIDES 4 OUTSTANDING SAVINGS

1. More Prime Surface for More Efficient Heating.
2. Develops Quick Heat for Quick Starts. (As Much as 50% Faster Than Pipe Coil.)
3. Takes Half the Space, Weighs Half as Much as Pipe Coil.
4. Platecoils Are Easily Cleaned or Replaced in Minutes . . No Downtime . . No Tank Dumping.

*Take advantage of the complete engineering assistance offered by Kold-Hold to help you with your heat transfer problems.*

**Send for complete technical manual and descriptive Bulletin No. P50**

**PLATECOIL**
Division
KOLD-HOLD MFG. CO.
LANSING 4, MICHIGAN

### TANK MAINTENANCE WITHOUT LOSS OF SOLUTION

There is no need for workmen to get inside the tank in order to make replacements or repairs. A Platecoil can be removed in a matter of minutes with the solution still in the tank.

### LITERATURE

The new Platecoil Bulletin furnishes a complete description of the Platecoil method of tank heating. Write for your copy today.

### HIGH BTU TRANSFER

More prime surface of Platecoil can be installed in a given area than can be obtained with pipe coil. Thus a more compact Platecoil unit provides much greater BTU transfer per unit area than can be obtained with pipe coil. Quick starts in heating tank solutions mean more hours of productive time.

## Why Platecoils Cost Less

### LOW FIRST COST

The initial cost of Platecoil is often 50% or more below the cost of equivalent pipe coil depending, of course, on the materials used in construction.

### EASY INSTALLATION

By the use of "quick change hangers" Platecoil installations can be made in open tanks in one-half hour or less by one man and a helper.

### NO THREADED JOINTS IN TANK

The entire Platecoil is electric welded and pressure tested. There are no joints to corrode or leak. Both connections to the Platecoil can be located above the liquid level where there is no danger of thread corroding and freezing.

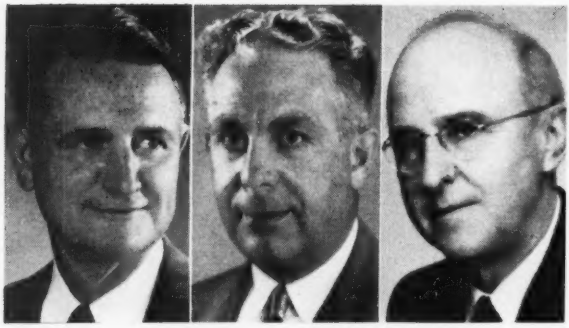
### GREATER TANK CAPACITY

A 22" x 47" Platecoil gives the same heat transfer surface as 32 feet of 1½" pipe. This pipe requires a space approximately 30" x 60". Platecoil thus saves about 50% over equivalent pipe coil.

### WEIGHS 50% LESS

Weighing only about half as much as equivalent pipe coil, Platecoil is easy to handle. A whole maintenance crew is not needed to transport and install Pipecoil.

**Kold-Hold Manufacturing Company, Lansing 4, Michigan**



J. B. Woods (left) Edward F. Teyber, C. L. Vandeman

of the division's Buffalo sales district.

Both Mr. Frizzell and Mr. Crawford will continue to headquarter at the division's offices in the Wickwire Building, located at 361 Delaware Avenue in Buffalo, New York.

---

Other changes in the Division include the appointment of **ROBERT DRERUP**, formerly of the Industrial Trade Sales Department, as assistant manager of the new division, and **FRANK MUSCH** as industrial representative in the Chicago area.

Concurrent with these changes was the retirement of **C. L. VANDEMAN**, manager of Industrial Trade Sales. Mr. Vandeman has served Lowe Brothers for 33 years. and is widely known as an authority on industrial finishes, especially in the machine tool industry.

---

**RICHARD H. FRIZZELL** was appointed sales manager of the Structural Products Department of the Wickwire Spencer Steel Division of The Colorado Fuel and Iron Corporation, it was announced by H. C. Allington, general sales manager of sales, at the executive offices of the corporation in New York City.

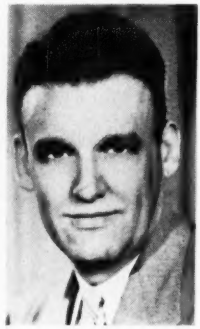
Richard H. Frizzell

In 1933, prior to the merger with The Colorado Fuel and Iron Corporation, Mr. Frizzell joined the then Wickwire Spencer Steel Company. He has served in various capacities in the sales department and the mills of Wickwire since then, except for four years' service in the U. S. Army Air Forces.

Mr. Frizzell succeeds to the position of **G. L. CRAWFORD**, who will devote his full efforts to that of sales manager

The Optimus Detergents Co., Matawan, N. J., has announced the appointment of **CHARLES N. CHALFANT** as industrial service representative in the metropolitan New Jersey area.

Mr. Chalfant brings to Optimus four years of intensive experience with the Wyandotte Chemical Company in sales and service engineering. Prior to that, he was Detroit service representative of G. Whitfield Richards, manufacturer of cutting, drawing, and grinding lubricants. His previous industrial experience had been as a member of the chemical and metallurgical laboratory staff of the Copperweld Steel Company. Background in chemical and metallurgical studies was at Carnegie Tech and the University of Pittsburgh.



Charles N. Chalfant

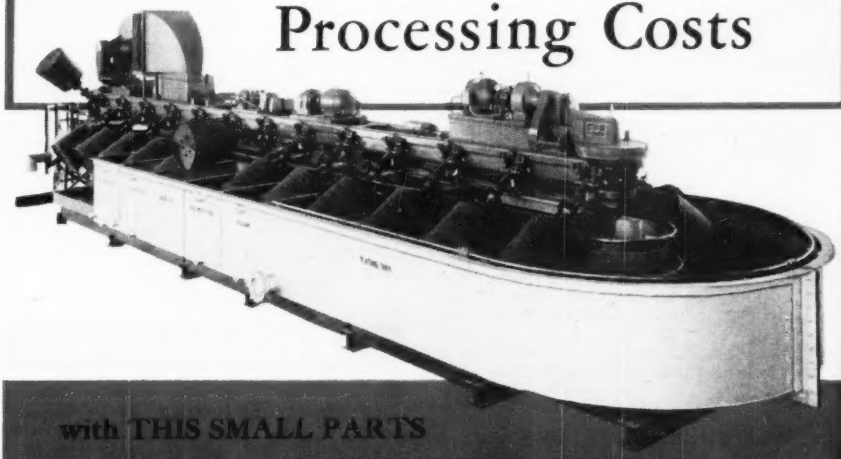
---

George L. Wirtz, president of the Atlas Mineral Products Co., Mertztown, Pa., has announced the following personnel appointments:

**EDISON C. SICKMAN**, formerly Baltimore district sales manager, has been appointed general sales coordinator. Prior to joining Atlas, he worked in various phases of management and sales in the plating supplies and metal finishing fields.

**RAY RUSSELL GRAVER** has accepted a position in the Atlas engineering department. Mr. Graver recently received

# Stevens Can Cut Your Unit Processing Costs



with THIS SMALL PARTS PLATING MACHINE WHICH COMBINES PLATING AND MATERIALS HANDLING

• Look at the advantages of the Stevens Small Parts Plating Machine. It is almost completely automatic throughout the entire processing operation. This machine can be loaded automatically or manually —and requires only one operator in either case, since the machine automatically unloads. Removal of processed parts can be handled by conveyor belt or tote boxes with either lift truck or conveyor method. Give your plating or processing operations the benefit of the time and labor savings offered by this Stevens Small Parts Plating Machine. Call in your Stevens representative today for complete information about this low per-unit-cost processing machine.

**CONSIDER THESE ADVANTAGES:**

- ★ **Low Unit Processing Costs**
- ★ **High Production Capacity**
- ★ **Reduced Maintenance Expense**
- ★ **Complete Interchangeability of Parts**
- ★ **No Overhead Equipment**
- ★ **Simple to Install**
- ★ **Extreme Flexibility of Operation**

**METAL FINISHING EQUIPMENT AND SUPPLIES SINCE 1883**

FREDERIC B. STEVENS INCORPORATED

BRANCHES • SALES OFFICES

BUFFALO • NEW HAVEN • INDIANAPOLIS • CLEVELAND

Representatives in Principal Cities

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FREDERIC B. STEVENS OF CANADA, LTD.

WINDSOR • TORONTO

ONTARIO

his B.S. degree in chemistry at Muhlenberg College. **GERALD F. GILBERT, JR.,** who recently received his B.S. degree in chemical engineering from Lehigh University, has accepted a position as assistant to the technical director.

## TRAINING COURSES

According to a recent announcement, the evening course on Paints, Varnishes, and Lacquers sponsored by the Technical Educational (Joint) Committee of the **PHILADELPHIA PAINT, VARNISH & LACQUER ASSOCIATION** and the **PHILADELPHIA PAINT & VARNISH PRODUCTION CLUB** was most successful and will be repeated this year.

Consisting of 29 lectures, the course was conducted by Dr. William T. Pearce, consultant on organic coatings. Specialists were also brought in to discuss a number of the subjects covered.

---

The **JOSEPH B. KUSHNER ELECTROPLATING SCHOOL,** is accepting enrollments in its revised correspondence course in "Electroplating Know How."

The School is licensed by the Department of Public Education of the Commonwealth of Pennsylvania and the course is recognized throughout the 48 states for vocational training in modern electroplating techniques. It is given under the direct personal supervision of Joseph B. Kushner, Consulting Electroplating Engineer.

A certificate suitable for framing is awarded to those men and women who complete the course with grades of 75 per cent or better. While the course may be started at any time during the year, early fall enrollments are advised as only a limited number of students are accepted during a given time period. For complete details, write to the Joseph B. Kushner Electroplating School, Stroudsburg 1, Pennsylvania.

## NECROLOGY

**GEORGE R. GIBBONS,** one of the pioneers in the development of the aluminum industry, and a director of Aluminum Company of America, died September 3, at the age of 71.


SAVE MONEY
IN YOUR METAL FINISHING DEPT.

Standardize on DETROIT HANDY "TAC" RAGS and stop losses due to rejections. Specify "DETROIT" for removing all particles of dust, lint and sand. Try this modern method today. Order from your supplier at once, or send for sample.

DETROIT HANDY "TAC" RAG
DETRO MFG. & SALES CO., INC., CULVER CITY, CALIF.

FORM-A-ROC
FIRST-COAT
FOUNDATION
FOR FINE FINISH

1. Dries with lacquer speed.
2. Has double lacquer solids at spray gun.
3. Fills very well—sands easily.
4. Adheres tenaciously to steel, wood, presdwood, aluminum, galvanized metal, etc.
5. Holds out lacquer, synthetic or oleoresinous enamels exceptionally well.
6. Thins 3:1 with xylol.
7. Available in GREY, SALMON and OFF-WHITE.
8. Ground well to smooth texture.

MADE BY
The Varnish Products Company
5208 Harvard Avenue Cleveland, Ohio

CUT SPRAY PAINTING COSTS

SPEED UP PRODUCTION

One color after another can be accurately wet painted on many concave, convex or irregularly shaped three dimensional plastic parts by using

# ELECTRO-FORMED METAL MASKS

**(Made by Patented Process)**

Clean, sharply defined letters and decorative effects are obtained on intricately designed emblems, toys, nameplates, horn buttons and household appliance utility markings, etc. No fogged edges. Avoids afterwiping or buffing off of overspray. The "loose" inside of letters and numerals, such as "0" and "6," is held in position by arched bridging to effect perfect characters without objectionable "ties."

Can be fitted to fixtures on production lines. Used in production of hundreds of nationally known products.

In the fixture illustrated above, the foot treadle operates air pressure pads to seal the part tightly in the mask.

*Send Coupon Today*

## CONFORMING MATRIX CORPORATION

**356 TOLEDO FACTORIES BLDG.** **TOLEDO 2, OHIO**

I am interested in metal masking shields. Please send without obligation: ☐ Further information. ☐ Quotation on masks for parts (or prints) which I am forwarding.

*Name* .....

*Firm* .....

*Street* .....

*City and State* .....

Mr. Gibbons, who retired as senior vice president of Alcoa on January 1, 1949, spent his entire business career with Alcoa. In addition to his position in the parent company, he held directorships and served as an official of several Alcoa subsidiaries.

---

James H. Heroy, Sr.

Announcement has been made of the death of **JAMES H. HEROY, SR.**, vice president and director of the Pittsburgh Plate Glass Company.

A graduate of Columbia University, Mr. Heroy had been associated with Pittsburgh Plate since 1902. He had been a director since 1924 and served as vice president in charge of the Brush Division since 1935.

# meetings

## OF INTEREST TO FINISHERS

**Oct. 11-13. Electrochemical Society,** 98th Meeting, Hotel Statler, Buffalo, N. Y. Society address: 234 W. 102nd St., New York 25, N. Y.

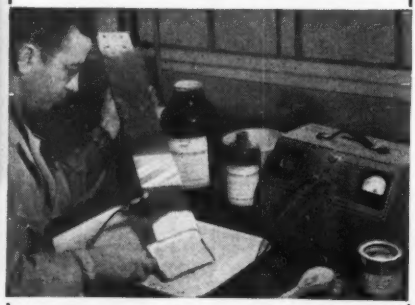
**Oct. 23-27. National Metal Congress & Exposition,** International Amphitheater, Chicago. American Society for Metals, 7301 Euclid Ave., Cleveland, Ohio.

**Nov. 9-11. Federation of Paint and Varnish Production Clubs Convention,** Congress Hotel, Chicago, Ill.

**Nov. 15-17. 62nd. Annual Convention, National Paint, Varnish and Lacquer Asso.,** Fairmont Hotel, San Francisco, Calif.

**Nov. 18. Annual Educational Meeting, Phil. Branch, American Electroplaters' Society.** Broadwood Hotel, Phil., Pa.


**Brush Electroplating for Many Uses**



• Protective or decorative finishes • Touching-up damaged, defective or worn plating • Rust-proofing metal surfaces • Hard-plating wearing surfaces • Plates on practically all metals • Low cost . . . usable anywhere • Portable—you take the unit to the job.

*Write today for Bulletin 148.*

**AJAX-CONSOLIDATED CO.**
4607 W. 20th St. Chicago 50, Ill.

**USE OUR**
*Technical Consulting Service*
**HARRISON & COMPANY, INC.**
*Twenty-Seven Years of*
**SERVICE — QUALITY — PRICE**

4A

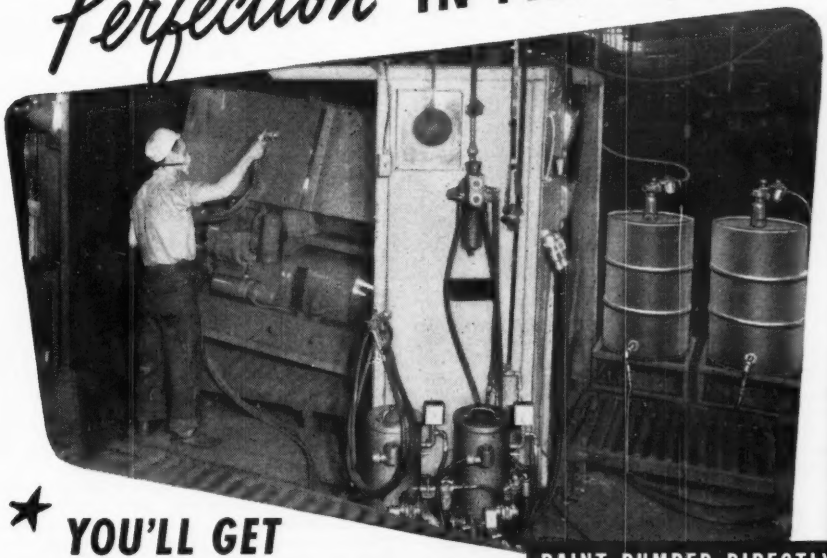
**For Free Technical Consulting Service, pertaining to Polishing and Buffing . . .**

**Write for complete information.**

*A Complete Line of Compounds Tailor-made to suit your particular requirements.*

**HARRISON & COMPANY, INC.**
HAVERHILL, MASSACHUSETTS

# LOOKING FOR *Perfection*★ IN FINISHING?



## ★ YOU'LL GET BETTER RESULTS WITH BEDE PAINT HEATERS

PAINT PUMPED DIRECTLY FROM ORIGINAL DRUMS AT LINCOLN ELECTRIC CO.

*Here are 8 reasons for trying this new process of finishing:*

1. Solids are higher
2. Solvent waste is lower
3. 43% greater coverage
4. Fewer coats needed
5. Better flow-out
6. Increased capacity of finishing room
7. Finish has less tendency to sag
8. Blushing is eliminated

Want additional reasons? Write, wire or phone NOW for *complete* information. No obligation.

BEDE Paint Heaters are approved by both the Underwriters' Laboratory and the New York City Board of Standards and Appeals . . . Explosion Proof! Aluminum is used as the heat-transfer agent, eliminating water and other troublesome liquids.

At the Lincoln Electric Company, Cleveland, Ohio (shown above), two colors are pumped directly from original 55-gal. drums by two BEDE Circulating Paint Heaters. Full coverage of welders is attained with one pass instead of the two formerly necessary.

WRITE . . . For your Free copy of "The Hot Spray Process . . . Advantages - Causes - Effects" by James A. Bede . . . and complete information.

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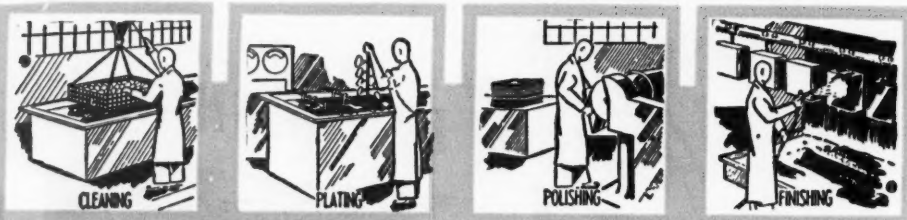
INDUSTRIAL FINISHING SPECIALTIES
4311 RIDGE ROAD • CLEVELAND 9, OHIO

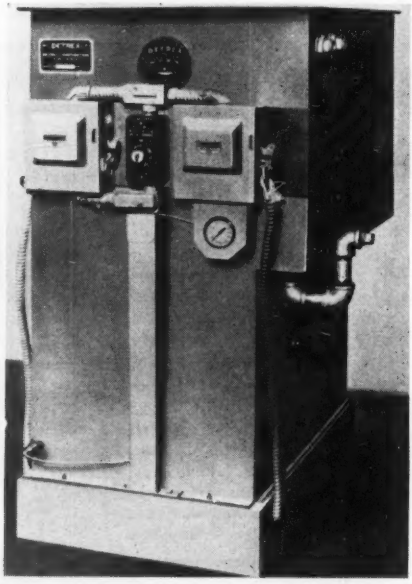
District Sales Offices: Cranford, N. J. • Detroit, Mich. • Chicago, Ill. • Dallas, Texas • Menlo Park, Calif. • Distributors in Principal Cities




# New • EQUIPMENT • MATERIALS • PROCESSES

## Silicone-Glaze Removal Tank and Solvent

A small silicone-converting tank which removes glaze in only 8 minutes from all types of bake utensils at a temperature of only 125 deg. F. has been placed on the market by Detrex Corp., Box 501, Detroit 32, Michigan.



Silicone-Converting Tank used for the removal of glaze from bake pans.

According to the manufacturer, glazed pans are simply nested in a basket and Immersed in SC solvent for a few minutes. Upon removal, the pans are rinsed with a hose, no further equipment being required. The penetrating power of the solution is so great that all parts of the nested pans are reached and glaze is removed even from folds and beads.

The entire body of the unit is fabricated of heavy gauge zinc-coated steel and is eutectic welded. The lower converting section is thermostatically controlled. The operating temperature required is only 125 deg. F. It is bottom-heated, either with electrical strip heaters or steam jacket. This method of heating without inside coils can be used because SC solvent does not decompose or sludge out in the presence of the caustic activator, the company states. The depth of solvent required, therefore, need only be sufficient to cover the work.

The solution is never partially decanted or thrown away, but is used over and over without daily maintenance. Whenever grease, flour, and other foreign soils carried in on the pans finally slow down fast glaze removal, the solvent is purified by simple distillation. The unit thus functions as a dual-purpose machine for converting glaze and purifying the solvent. The upper "still" section is equipped with condenser, distillate collecting trough, and built-in after-cooler and trap. Frequency of purification depends upon amount of carbon particles and foreign soil introduced with the glazed pans, and may be required three or more times a year depending upon production.

The SC Tank is only 48 inches high and occupies less than 6 square feet of floor space.

SC Solvent is water-stabilized, and therefore does not mix with water. Also it does not leave a powdery residue; hand-scrubbing is eliminated, and glaze adherence and smoothness are greatly improved. SC Solvent is safe even to the oxide film on tinned utensils, and to aluminum pans as well, it is claimed.

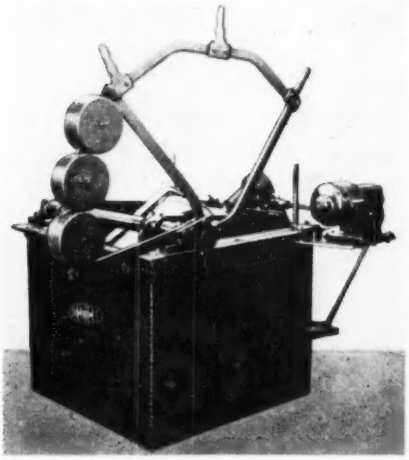
## Oxidizing Liquid

An effective liquid which produces oxidation rapidly and with excellent results has been marketed by the Hanson-Van Winkle-Munning Co., Matawan, N. J. By adding ¼ fluid ounce of concentrated H-VW-M Oxidizing Liquid to each gallon of water, an oxidizing solution may be made for copper, bronze and silver. This solution will not deteriorate and there is no waste, it is claimed. Solutions may be used hot or cold but faster operation is obtained when hot.

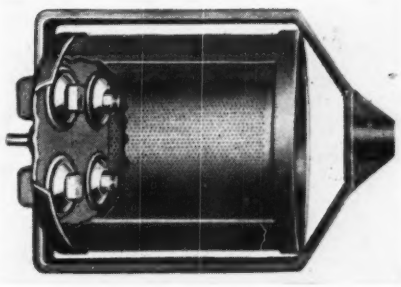
## Improved Plating Barrel

The Daniels Plating Barrel and Supply Co., 129 Oliver St., Newark, N. J., has announced an improvement on all Standard Type OLS Plating Barrels.

The OLS contact frame which supports the standard Daniels perforated cylinder and carries current to the plating parts through the chrome plated contact studs is now being produced of cast aluminum and insulated by semi-hard homogeneous rubber. Advantages claimed for this change include the fact that more current is carried directly to the work, there is less internal resistance, equal strength and rigidity, and less operator fatigue.



Standard No. 4 OLS Plating Barrel



Daniels OLS contact frame and perforated cylinder partially cut away to show construction features.

Illustrated is the Daniels Standard No. 4 OLS Plating Barrel showing the counterbalanced lift for manually removing the cylinder from the plating tank. By using the aluminum contact frames together with various other component parts of aluminum, the company has been able to produce the barrel with only two counter weights rather than the three pictured, with less lifting power required for loading and unloading.

## Enthone Metal Stripper N-165

Enthone, Inc., Dept. PF, 442 Elm St., New Haven, Conn., has announced the development of a metal stripper for the rapid stripping of nickel, tin, lead, and chromium from copper, brass, and other copper alloys without attack upon the base metal. The process involves no current. The work to be stripped is immersed in an acid solution containing Metal Stripper N-165 and rapid removal of nickel and the other metals is accomplished. Stripping rates as high as 0.006 inch per hour of nickel have been obtained. The process is stated to be ideal for removal of nickel from bulk plated work as well as heavier plated objects, such as percolators, flashlights, plumbing goods, and other items made of copper. It is also suitable for rapid removal of nickel and chromium from tips of plating racks.

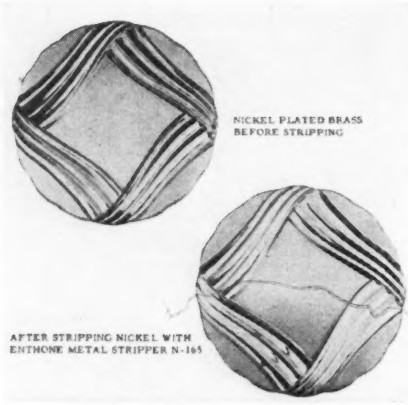



Illustration of nickel stripping without attack on base copper alloy

According to the manufacturer, the process is simple to use. One pound of Enthone Metal Stripper N-165 is added to each gallon of acid solution. Stripping can be done at room temperature or at higher temperatures if faster stripping is desired. The process is not suitable for removal of nickel from steel or zinc base alloys. Enthone's Metal Stripper "A" is recommended for removal of nickel from steel without attack.

## United Lacquer One-Coat Multi-Color Finish

A multi-color finish, which makes it possible to apply two or more colors in a single coat, was announced recently by the United Lacquer Manufacturing Corp., 1001 W. Elizabeth Ave., Linden, N. J. Called MultaColor, its evenly-distributed colors produce an attractive broken surface effect.

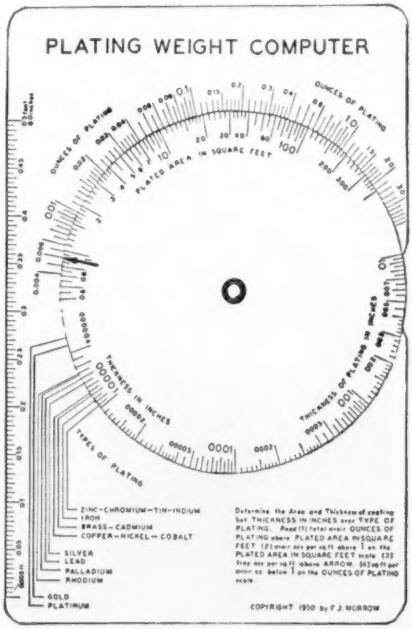
In laboratory test runs, MultaColor has been used effectively to give a many-colored finish to furniture, toys, pencils, book cases, filing cabinets, broom handles, ladders, and many other items. Brown-and-white and black-and-white MultaColor is being used to provide a marbleized finish.

Because the enamel may be applied with good results to porous materials, it is said, it will prove extremely valuable for attractively finishing various composition boards, wallboards, beaver board, and asbestos board.

Applied by dip or spray, even to wet surfaces, MultaColor will be available initially in 16 color combinations, but it may be prepared in an infinite variety of others. Some of the standard combinations are: brown-and-white, tan-and-white, green-white, light blue-dark blue, and pink-white.

## Plating Weight Computer

Morrow's Plating Weight Computer, marketed by F. J. Morrow, 288 Montgomery St., Bloomfield, N. J., is a pocket-size precision device which correlates the thickness of sixteen types of electroplating with weight of deposit and area. Readings are obtainable in total avoir. oz., avoir. oz./sq. ft., sq. ft./ avoir oz., and troy oz./sq. ft. The computer is said to be especially useful in specification work where a definite thickness or weight of plating is needed, or if the oz./sq. ft. is required for cost analysis.




Morrow's Plating Weight Computer

*Announcing*

*An Important Merger...*

# DARCO CORPORATION

ATLAS SUBSIDIARY

*becomes*

# DARCO DEPARTMENT

## ATLAS POWDER COMPANY

Darco Corporation, formerly an unconsolidated subsidiary, is now an integral part of Atlas Powder Company. Present Darco personnel and facilities—manufacturing, sales, and research—are continued in the Darco Department.

Darco plant expansion at Marshall, Texas, is being pushed to completion. With this added capacity—backed by Atlas Powder Company's resources and extensive research, development and engineering facilities—Darco is set to maintain its position as a leading manufacturer of activated carbons for the refining of cane, beet and corn sugars, for the purification of chemical products, vegetable oils and fats, water supplies, textile chemicals and dry cleaning and electroplating solutions.

DARCO

REG. U. S. PAT. OFF.

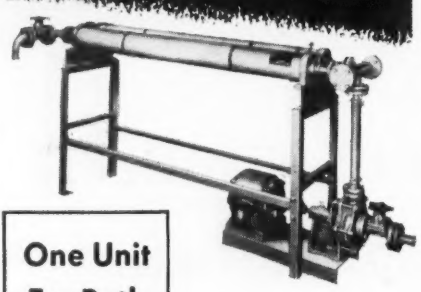
DARCO DEPARTMENT

ATLAS POWDER COMPANY

Darco General Sales Offices

60 East 42nd Street, New York 17, N. Y.

*Simplify*
**HEATING and COOLING of Plating Solutions**



**One Unit For Both**

That's one big advantage of INDUSTRIAL'S Unit Heat Exchangers—you use the same unit for both heating and cooling. Maintaining the desired working temperature, by alternate heating and cooling in the one unit, simplifies controls and operation. The units are adaptable to either manual or automatic control.

INDUSTRIAL'S Unit Heat Exchangers are available complete with pump and stand, or tubes alone can be had for wall or ceiling mounting. A wide choice of capacity, too, is possible by using from one to six tubes in a unit. Special units are readily engineered to meet unusual capacity or space requirements.

★ ***Write for recommendations***

**Water Demineralizers . Filters**

**INDUSTRIAL FILTER & PUMP MFG. CO.**

5904 Ogden Avenue, Chicago 50, Illinois


## Sarcostat Hydraulic Motor Valve

Sarco Co., Inc., Dept. 54, Empire State Bldg., New York 1, N. Y., has announced its electro-hydraulic motor valve for open-and-shut control. Two-wire, normally closed, for direct connection to 110-volts a.c., 60-cycle current, the valve is designed for automatic operation by thermostats or pressurstats or by liquid level or flow controls.

Sarcostat Type O Hydraulic Motor Valve

As a shut-off valve in an inaccessible location, it can also be actuated by a push button. The Sarcostat valve is constructed to handle steam, water, oil, gas, air, and so on. It is also an ideal valve, the manufacturer states, for the remote control, by hand or thermostat, of steam or water branch mains for space heating systems. Its gradual opening action protects the piping; quick closing prevents overheating.

The valve operator, actuated by hydraulic power, operates single-seated valves up to 1½ inches or double-seated valves up to 4 inches at 125 p.s.i. It does this by direct thrust, without resort to pilots, gears, or levers.

When the full stroke is used, standard valves will open in 60 seconds and close in 10 seconds. The unit is also available with an adjustable stop for partial throttling.

Valve bodies are of brass or iron with union or flanged connections. Various types of valve bodies are available: single-seated, needle, piston, or double-seated. Operators are dust-moisture and fume-proof. They also can be furnished explosion-proof.

---

## Luster-on Utility-15

Luster-on Utility-15, product of The Chemical Corp., 54 Waltham Ave., Springfield 9, Mass., is a zinc bright dip which produces a brilliant stain-free finish and provides excellent passivity to electrodeposited zinc. A Luster-on finish may be handled freely during assembly or packing without fingermarking.

Luster-on does not impair electrical conductivity or interfere with spot weld-

# "Say AH...

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Ahco Buffing Compounds and Ahcoloid Metal Cleaners are the best prescription for "finishing room fever"—caused by drudgery and overwork when you use outmoded cleaners and compounds.

There's an Ahcoloid Metal Cleaner for every industrial cleaning job—yours included . . . prepared by Apothecaries Hall Company chemists with years of experience in prescribing for specific cleaning requirements . . . their research has cut down cleaning time in scores of plants. Ahco Buffing Compounds, for buffing, cutting down, or coloring increase production because they mean more pieces buffed per hour . . . more pieces between wheel dressings.

Since 1849 Apothecaries Hall Company has been helping industry to do its job better; your plant need be no exception. Whatever your cleaning and buffing requirements, write today and learn what Ahco Buffing Compounds and Ahcoloid Metal Cleaners can do for you.

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Please send me a free copy of your new booklet, "Ahcoloid Metal Cleaning Compounds".

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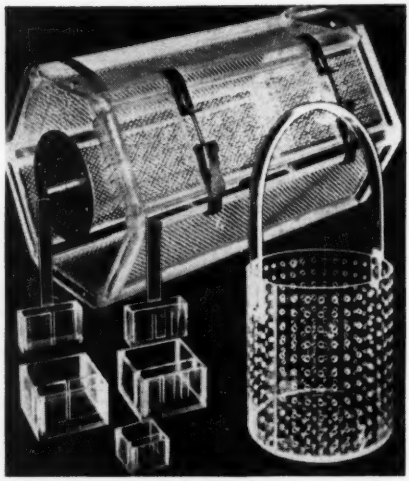
ing, and provides an adhesive base for lacquers and cements, the manufacturer states. It may be diluted up to ten times or more, replenished with the same solution, and still remain exceptionally stable, it is claimed.

## Lucite Chemical and Plating Equipment

Transparent chemical and plating equipment, including pickling baskets, tanks, and accessory equipment, can now be supplied in boilable or high-temperature Lucite plastic for electroplating and chemical processing by the Singleton Co., 9823 Lorain Ave., Cleveland, Ohio.

Features of the equipment, according to the manufacturer, include excellent resistance to all acids, alkalies, and hot processing solutions up to 220 deg. F.; versatility in that baths may be interchanged in containers without contamination; thermal and electrical insulation; easy machinability so that both production and laboratory equipment may be fabricated or modified without difficulty; transparency, which is eleven per cent greater than glass; high impact strength; and sound construction features, including the exclusive Singleton Fusion-Welded no-leak seams. The light weight of the products makes handling in laboratory use or production a simple matter.



Three Singleton H-T Lucite products: (top) plating cylinder, (lower left) plating range cells, (lower right) dipping basket

## Hysol 3000 and 4000

Coatings to protect metals against corrosion by various precessing chemicals designated as Hysol 3000 and 4000 have been developed by Houghton Laboratories, Inc., Olean, N. Y. These organic coatings may be applied to steel surfaces either in the field or in the plant of the coating suppliers, and are said to provide protection for long periods of time.

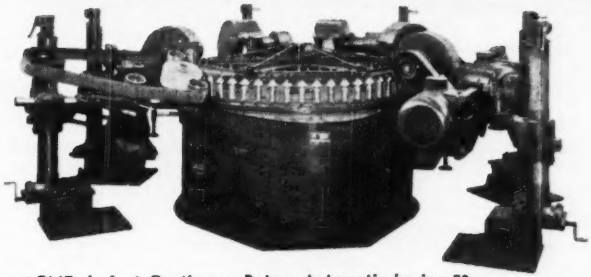
The accompanying illustrations show two applications as typical examples of the many industrial uses for Hysol Corrosion-Resistant Coatings. On the left are shown two mixing tanks which have been in continuous 24-hour service for over eight months with no sign of damage to the tanks or breakdown of the coating. One tank contains 3.3 per cent ferrous sulfate, and the other 8.6 per cent Calogen solution. Coatings of the Hysol 400 Series were used in this application. applied in the field over sandblasted steel. The specific coatings used in the

FOR HIGH PRODUCTION POLISHING and BUFFING

# ACME Automatic

## POLISHING and BUFFING MACHINES

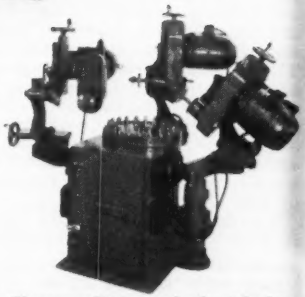
## ACME CONTINUOUS ROTARIES



Deliver High Production with Uniform Quality Finish at Low Unit Cost

*Above:* ACME six foot Continuous Rotary Automatic having 50 continuously revolving chuck spindles. One ACME adjustable polishing belt head and five ACME adjustable floating head polishing and buffing lathes are used in this arrangement built to finish plumbing good escutcheons.

*Right:* ACME Type L. C. Continuous Rotary Automatic with 20 spindle continuously revolving table with variable speed control. Three ACME completely adjustable polishing and buffing lathes are used in this arrangement.



*These machines can be furnished in sizes and arrangements to handle many types of parts with high output and uniformity of finish.*

ROTARY STRAIGHT LINE SEMI-AUTOMATIC AND SPECIAL *Polishing and Buffing Machinery*

ACME Continuous Type Rotaries are built in table sizes from 20 *inches* to 10 *feet* or more in diameter and with a varying number and spacing of work spindles depending on piece being finished. They provide a proved solution to many production finishing problems and have earned wide recognition for their dependability and cost cutting performance.

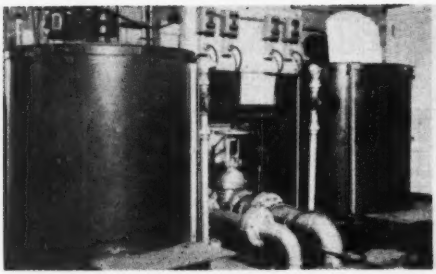
*(Catalogs on Request)*

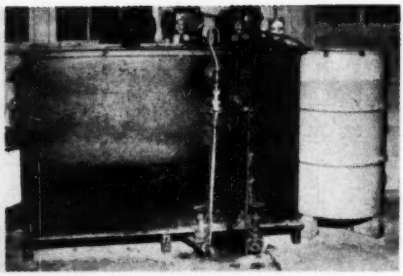
SPECIAL MACHINERY AUTOMATIC BUFFING MACHINES

ACME Manufacturing Co.

1645 HOWARD ST. DETROIT 16, MICH.

Builders





order of their application were Hysol 4076, 4401, 4201, and 4301.

The illustration at the right shows a drum containing 15 per cent sodium hypochlorite at room temperature which has been in continuous service for eight months without damage to the coating or the drum. This drum was coated with EP Primer, followed by Hysol 3401 (3000 Series), the coating shop applied.

## Extruded Zinc Anodes

Offered by the Hanson-Van Winkle-Munning Co., Matawan, N. J., are extruded zinc anodes, either as cylinders for ball anode containers or in any desired length in elliptical form.

Corrosion characteristics of the anodes are considerably improved and the metal structure is denser, the company states. They are 99.9 per cent pure and are available in pure zinc ZX, or combined with aluminum to make the H-VW-M ZAX anode. They will not polarize excessively or produce sludge. When these ZA anodes are used, solutions remain clean and metal concentration has a high degree of stability.

The anodes are recommended for use in both cyanide and acid zinc solutions.

## Pylumin Process

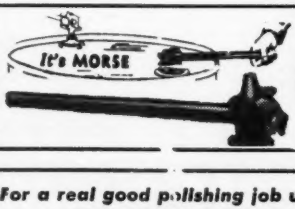
A patented process which has been in use by the Pyrene Manufacturing Company in both Great Britain and America for a number of years is now being offered to others for the protection of aluminum. Known as the Pylumin Process, it produces an attractive coating having definite corrosion-resistance value if no paint finish is applied, and in addition, provides an adhesive and efficient base for paint finishes.

It is claimed that Pylumin is simple to operate since it is an immersion process and employs a single powder whose ingredients have been proportioned and premixed. As a result there is no chance for error. In addition, the solution is easily maintained through the use of a simple Pylumin test kit and necessary additions of the single powder.

Ordinary, heated steel tanks are required for operation of the process. Unless there is an exceptional amount of grease and dirt on the parts to be processed, no special cleansing is required in advance, for the cleaning and processing can be done in one operation.

The process is adaptable to either large or small-scale production and it can be used on widely varying products made of aluminum and aluminum alloy.


Send NOW for this FIT-ALL
**DRUM PLUG WRENCH**
*Instantly loosens, tightens 95% all plugs or bungs in steel drums.* Has 16" extra-strong steel tubing handle. Wgt. only 2 lbs. Order 1 or more today!

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**Keystone TURKISH Emery**
FRESH SUPPLY AVAILABLE
KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila., Pa.

*"Paw thought it would be nice ef we drove up an' showed our appreciation of yore wunderful new HAMMEROC finish"*

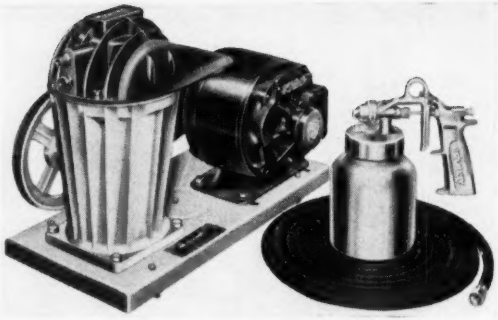
We've been getting compliments by the carload on this new, easy-to-use, one coat hammered-effect finish. No splatter coat of thinner or special spray gun is required for application and the final result rivals in beauty the finest work of ancient craftsmen. Hammeroc holds a uniform pattern, provides excellent coverage, has superior hiding properties. We'd like to know what *you* think of it. Write today; samples and quotations will be sent you promptly.

***Remember, Ferro Is Set Up to Provide Complete Organic Coatings Service. From the Development of Specialized Coatings to Designing and Installing Efficient Finishing Oven Systems.***

**FERRO** **ENAMEL CORPORATION**
**LIQUID PLASTICS DIVISION**
**4150 East 56th Street • Cleveland 5, Ohio**

Vedoc

Sharpcraft 40 Portable Paint Spray Unit



There being no dimensional changes, it is not necessary to make allowances for close tolerances.

The Pylumin process does not require a license but simply the purchase of the Pylumin chemicals and Pylumin test kit supplied with full instructions for installation and operation by the Pyrene Manufacturing Co., Metal Finishing Div., 10 Empire St., Newark 5, New Jersey.

## Portable Paint Spray Unit

Sharpcraft 40, a portable paint spray unit marketed by the Sharpe Manufacturing Co., 1224 Wall St., Los Angeles 15, Calif., offers a choice for the best atomization for all types of materials, and is precision machined and designed to feature the self-centering principle of fluid tip and air nozzle construction for assured performance.

The unit features a ¼ h.p. motor with a compressor speed of 1150 r.p.m.; New Departure oilless sealed ball bearings; long lasting nylon inserted rubber diaphragm; perfectly balanced crankshaft; deep cooling fins; lightweight carrying handle; steel base; rubber feet; leaf-type valves; air filter and safety valve; internal mix pressure, external suction, or combination type with one-quart aluminum cup.

## Cyclodiene Solvent Cleaner

Cyclodiene, product of the Technical Processes Div., Colonial Alloys Co., Philadelphia 29, Pa., is a liquid hydrocarbon solvent degrease fluid for all metals, which has many uses and desirable properties.

Among its factors are: speed of dissolving greases, oils, buffing compounds and other dirts from surfaces of all the metals; it is used at room temperature and requires no heating; it is not chlorinated and has no possible rusting effect on iron and steel; it is non-toxic either in its vapors or by contact; it is rated as a safety solvent with a relatively high flash point; it leaves a thin molecular protective film on the metal to pre-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Clear Metal Finishes
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Colored Lacquers
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**Free Bulletin ESA-198 shows how, where and why Borolon abrasive grain can bring real efficiency to your polishing operations . . . describes grain sizes and types . . . lists recommended uses . . . and tells how to use Borolon grain on set-up wheels with glue or cement. Write for your copy now.**

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Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds companies: Simonds Steel Mills, Lockport, N.Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

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WILL SPEED PRODUCTION

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For flat or contoured products . . . the answer to efficient production-quantity metal finishing may be a Clair Surface Finishing Machine. Including magnetic or vacuum chucks, these machines operate on enclosed hydraulic circuits for greater finishing efficiency and reduced maintenance costs. From the seven basic models a custom Clair machine may be developed to give maximum efficiency on your finishing operation. *Write for technical data.*

*May we show how a Clair Surface Finishing Machine can save money for you?*

CLAIR

MANUFACTURING CO., INC.
*Specialized Machine Equipment For Glazing and Polishing Operations*
OLEAN, N. Y.

vent rust during handling, and in between shop operations; it dries in a reasonably short time; it can be used as a straight degreaser or as a pre-soak prior to vapor degreasing. Method of application is by dip, spray, wipe, or brush; and it can be distilled for re-use.

---

## Model LSI-10 Filter Pump

Sethco, 105-07 150th St., Jamacia 4, N. Y., announces its Model LSI-10 Filter Pump which is equipped with a high temperature lucite filter cylinder and a

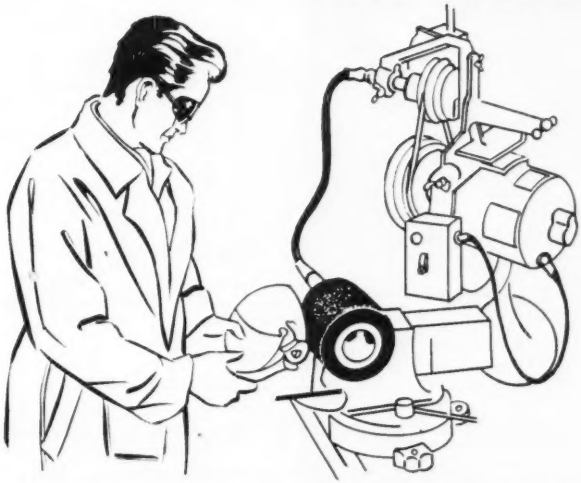
Sethco Model LSI-10 Filter Pump

stainless steel pump, and is rated at 100 gallons per hour.

The advantages of filtering with a lucite filter cylinder pump unit are claimed by the manufacturer to be as follows:

Complete resistance to all electroplating and industrial solutions; solutions up to 200 deg. F. may be used with complete safety; simple operation; filter cylinder holds less than one quart of solution, every drop of which is completely recoverable; filter tube is a specially processed cotton yarn wound around a stainless steel supporting core. Many thousands of gallons of solution may be filtered through the filter tube, and it can be used over and over again; filter tubes are wound so densely that even the finest particles are satisfactorily removed;

NEW, IMPROVED **NU-MATIC**



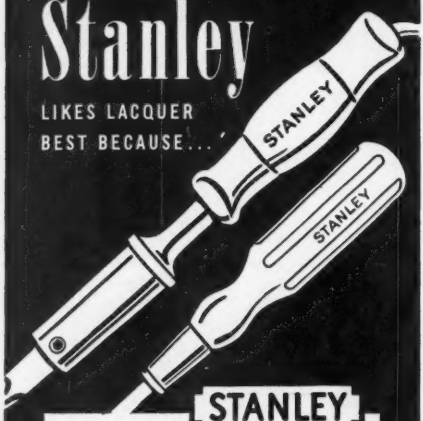
**THE WHEEL WITH THE PNEUMATIC DRUM**

With this Nu-Matic wheel the abrasive belt rides on a cushion of air contained in a rubber drum. Different pressures in the drum and different grits provide varied surface finishes. Deflate, and belts can be changed easily and quickly for grinding, sanding or polishing. Cut your labor, production and inventory costs with Nu-Matic grinding units. Adapters for 5/8"-11 or 1/2"-13 power equipment. (Specify size.)

**Adaptable to bench, portable or flexible shaft power.**

**NU-MATIC GRINDERS, INC., 10304 W. McNICHOLS RD.**
Detroit 21, Michigan UNiversity 3-2573

Stanley
LIKES LACQUER
BEST BECAUSE...'




STANLEY

. . . "glistening lacquer lends its finishing touch to the design perfection of Stanley Tools. Durable lacquer coats the wooden handling parts of Stanley screwdrivers, soldering irons, and carpenter's planes; best protects these parts from the lack-luster appearance resulting from rugged handling."

On the finishing line, lacquer pays another dividend. Lacquer is economical to buy, economical to apply. Quick-drying lacquer speeds production for Stanley Tools and many other producers of wood and metal assemblies.

*HERCULES POWDER COMPANY*
INCORPORATED
*927 Market St., Wilmington, Delaware*

HERCULES DOES NOT MANUFACTURE LACQUERS, ONLY THE INGREDIENTS FROM WHICH THEY ARE MADE.

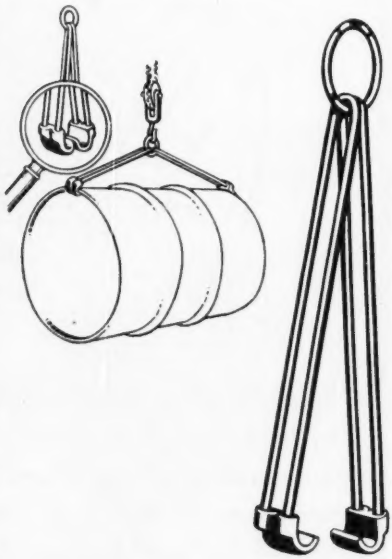
LACQUER
HELPS YOU SELL

OL50-28

and progress of the filtration can be watched through the transparent lucite cylinder.

## Drum Lifting Hook

The Morse Manufacturing Co., Inc., 124 Dickerson St., Syracuse 2, N. Y., has announced its improved Model No. 41



Improved Model No. 41 Drum Lifting Hook

Drum Lifting Hook which is now much stronger than before and also much lighter.

Designed primarily for lifting steel drums, although it may be used for barrels, the hook consists of double steel rods and a malleable steel hook with 3-inch diameter welded ring. Lifting capacity is 1,000 pounds.

## Pneumatic Agitating and Dipping Machine

D. C. Cooper Co., 1467 S. Michigan Ave., Chicago 5, Ill., has announced its Pneumatic Agitating and Dipping Machine, especially designed for automatic

## *Trouble Makers!*

*Do you remember this famous play?*

*In a game between Harvard and the Carlisle Indians half a century ago, one of the Indians hid the ball under his sweater and ran for a touchdown which was allowed. This caused plenty of trouble for the officials.*

**Abrasive dusts are trouble makers . . .**

***Stop them in your plant with***

# TORIT DUST COLLECTORS

Torit Dust Collectors trap abrasive dusts at their source. They cannot become a health menace, or lower the efficiency of your plant.

Torit Dust Collectors are self-contained. Compactly designed they require little space, and can be installed wherever convenient. They clean the air so thoroughly that it is recirculated into the room, thus eliminating heat losses.

Torit Dust Collectors are economical to purchase and install. They fit most standard grinding, cutting and polishing machines and can easily be adapted to meet special conditions. For details and the latest Torit catalog, write:

TORIT

**Manufacturing Co.**

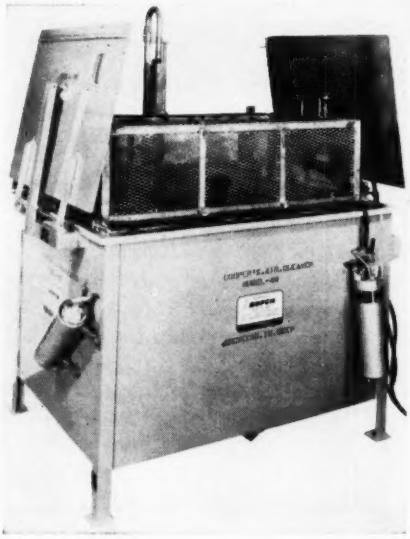
**314 Walnut St. • St. Paul 2, Minn.**

cleaning of metal parts, fingerprint removing, dipping of spare parts in rust preventives, oils and greases, and dipping of packages in wax.

Available in unheated, electric or gas heated models, the unit consists of a sturdily constructed steel tank, with bottom drain and overflow near top, and is equipped with an air cylinder for operating rack. Special valves and switches control the various operations of the rack. By a simple push-button operation, the rack will lower to the bottom of the tank and automatically start agitating. By pushing a button, agitation is stopped and the rack raises flush with the top of the tank for loading and unloading.

Cooper's Pneumatic Agitating and Dipping Machine is equipped with a rectangular, removable frame fitting within the inside area of the tank, designed to support a platform, basket, or both. The basket and rack are removable and interchangeable, and of heavy-duty construction.

The agitation consists of a vertical stroke of approximately 5 inches, with a speed of 18 to 20 strokes per minute, as a normal working speed. Speed can be adjusted faster or slower as desired. If no agitation is required, the machine can be furnished so that the racks will dip only, eliminating the agitation in the bottom.



Pneumatic Agitating and Dipping Machine

HOLLAND SAYS:
DEBURRING WILL CUT GRINDING COSTS
Motor Driven Tilting Tumbling Barrels for cleaning, polishing, grinding, deburring, sanding, burnishing and various other applications.
Wide selection of metal finishing equipment on hand. Write for FREE folder "M."
J. HOLLAND & SONS, INC.
MANUFACTURERS • DEALERS
276 SOUTH NINTH ST. • BROOKLYN, N.Y.


## Kold Grip Polishing Cement

Product of Park Chemical Co., 8074 Military Ave., Detroit 4, Mich., Kold Grip Polishing Cement is used to bind abrasive grains to the face of a polishing wheel. In many cases, it is also used to cement together the polishing wheel sections.

Applied by brush, the cement may range from a heavy liquid to a thin paste.


*Write*

**Sulphur Products Co.**

**Greensburg 8, Pa.**

*for*

**"FREE"**

**Information on Copper Stripping**

# Cambridge WOVEN WIRE BELTS

## Tailored to your Production Needs

Your Cambridge woven wire conveyor belt is engineered from the raw materials to the finished belt to give you maximum efficiency with a minimum of attention and maintenance.

Cambridge designs withstand heavy loads, high temperatures, cold, corrosive compounds or wet processes. They may be fabricated of any metal alloy in any mesh and weave. Where necessary, Cambridge belts can be fitted with various types of selvages, cleats and drives.

A Cambridge Rod-Reinforced Belt with Plate Selvages and Fabric Cleats provides cost-cutting continuous quenching of screws, nuts and bolts. This belt design offers the highest tensile strength, low thermal capacity and successful operations in temperatures as high as 2100° F.

Call your Cambridge Field Engineer whenever you have a problem concerning movement of materials during processing.

**VALUABLE BOOK, FREE! A complete, basic reference on conveyor belts, designs, systems and metallurgy. Write for your copy or call your nearest Cambridge office.**

## Cambridge Wire Cloth Co.

Wire cloth in rolls. Also specialized wire fabrications

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Chemically, it is made up with a sodium silicate base, modified with organic fillers. The kind of silicate and the amount and kinds of filler used determine the cement properties.

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## PRODUCT LITERATURE

*The publications listed in this section may be obtained free upon written request on company letterhead to the manufacturers concerned. Your courtesy in mentioning PRODUCTS FINISHING when requesting copies of these publications will be sincerely appreciated by the manufacturer and the publisher of this magazine.*

**"You Can Get Them All at Pyrene"** is the title of a four-page bulletin listing a wide range of finishing processes offered by the Pyrene Manufacturing Co., Metal Finishing Div., 10 Empire St., Newark 5, New Jersey.

**"What About Your Buffing and Cleaning Problems?"** is the title of a leaflet distributed by The Globe Compound Co., Inc., Waterbury, Conn., which discusses Globe Dispersible Buffing Compositions, their characteristics and general application.

---

**Polishing Cement.** Kold Grip Polishing Cements, improved adhesives for polishing wheels, are described and illustrated in a two-color, four-page bulletin prepared by the Park Chemical Co., 8074 Military Ave., Detroit 4, Mich. Park's Infra-Red Dryer is also shown and described.

---

**"A B C of Spray Painting Equipment"** is the title of a 32-page illustrated handbook which provides the answers to the most common questions pertaining to spray guns, cups, tanks, transformers, air compressors, and other items of spray painting equipment. Request for copy of this catalog should be addressed on company letterhead to The DeVilbiss Co., Toledo 1, Ohio.


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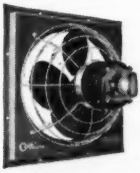

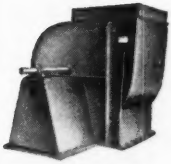

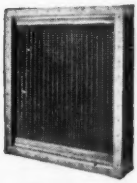

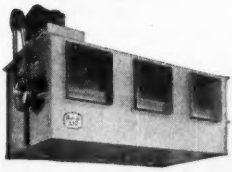

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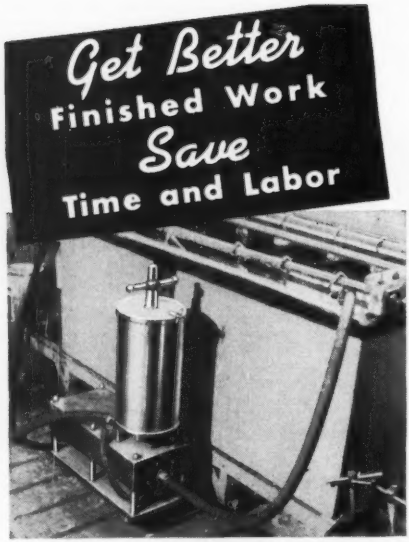


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**Alkaline Tin Plating.** A technical bulletin on electro-tinning is available from Metal & Thermit Corp., 100 E. 42nd St., New York 17, N. Y., producer of tin and antimony chemicals. The 24-page pamphlet gives suggested bath formulae and performance data on both potassium and sodium stannate plating solutions; contains suggestions and instructions for analyzing and controlling the bath, and has a section devoted to the high speed tin anodes recently developed by the company.


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**"Strip-Aid."** Klem Chemicals, Inc., 14403 Lanson, Dearborn, Mich., has issued a leaflet describing its "Strip-Aid," a compound which added in small quantities to alkaline type paint strippers speeds the action of the strippers.

---

**Bulletin No. T-105,** distributed by the Hanson-Van Winkle-Munning Co., Matawan, N. J., covers thoroughly the company's line of tank equipment for all types of electroplating, pickling, cleaning, rinsing, and similar treatments. The eight-page bulletin is illustrated throughout.

---

**Technical Cements.** A practical handbook on the application of adhesive cements and compounds is the **Engineers' Production Manual** issued by Sauereisen Cements Co., Sharpsburg Station, Pittsburgh 15, Pa. It contains 64 pages of useful information, with over 150 illustrations, data and charts, and will prove of value to laboratory technicians, production men, engineers, and others interested in the application of technical cements.

---

**"Paintgrip."** Helpful data for designers and shop men are contained in an illustrated, 12-page booklet published by Armco Steel Corp., Middletown, Ohio. **"In the Shop with Armco Cold Rolled Paintgrip"** outlines approved methods for fabricating and finishing the electrolytically zinc coated and Bonderized sheet metal.

Data obtained through research and observation of plant methods form the basis for recommendations on storing, forming, drawing, welding, cleaning, and painting "Paintgrip." Satisfactory drawing lubricants, cleaners, and paints are also listed.

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# Catalogs

## FOR YOUR LIBRARY

***To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.***

**1. Polishing Wheel Cement**

"Setting Up Polishing Wheels" is the title of a brochure prepared by Industrial Lubricants Co. Inc., Detroit, Mich., containing many tips on setting up polishing wheels with Grainlock polishing wheel cement for long life and maximum efficiency.

**2. Precious Metal Plating**

A 20-page booklet issued by A. Robinson & Son, New York 2, N. Y., presents in usable form accepted methods applied in the electroplating of such articles as watch cases, insignia, jewelry, novelties, pen and pencil parts.

**3. Brush Electroplating**

Equipment and supplies needed for operation of electroplating by the brush method are listed and described in Bulletin 148 distributed by the Ajax-Consolidated Co., Chicago 50, Illinois.

**4. Dust Collectors**

Catalog No. 34, published by the Torit Mfg. Co., St. Paul, Minn., outlines methods for collecting and cleaning dust-laden air from around industrial machines and includes complete information on the Torit line of self-contained and cyclone type dust collectors.

**5. Appli-Matic Bulletin**

A bulletin describing the operation of Vander Wal-Wagner Appli-matics, mechanical buffing compound applicators, is available from Wagner Bros., Inc., Midland, Detroit 3, Mich. Use of the Appli-matics in manual and automatic polishing and buffing setups, as well as advantages of the units, is detailed in the bulletin.

**6. Dulac Clear Lacquer**

Technical Data Bulletin 110 describing Dulac Clear Universal Lacquer No. 462 is available from the Mass & Waldstein Co., Newark 4, New Jersey.

**7. Industrial Chemicals**

A bulletin issued by the Harshaw Chemical Co., Cleveland 6, Ohio, lists alphabetically the chemicals supplied by the company to industries such as electroplating, ceramics, scientific laboratories, and so on.

**8. Finishing Equipment**

The Despatch Oven Co., Minneapolis 14, Minn., has available Bulletin 51-C descriptive of its finishing systems.

**9. Emulsion Cleaner**

Properties and operation of Ahcoloid Emulsion Cleaner are explained in detail in a booklet supplied by the Apothecaries Hall Co., Waterbury 88, Connecticut.

**10. Conveyor Belts**

A complete, basic reference on conveyor belts, designs, systems, and metallurgy is being offered by the Cambridge Wire Cloth Co., Cambridge, Maryland.

**11. Flock Color Card**

A color card illustrating 20 stock shades of flock in rayon, cotton, and wool can be obtained from the Claremont Waste Mfg. Co., Claremont, New Hampshire.

**12. Portable Spray Unit**

Complete information on the Binks DP ⅓ h.p. Portable Spray Unit, either electrically powered or gasoline engine driven, is contained in Bulletin 601, available from the Binks Mfg. Co., Chicago 12, Illinois.

**13. Rotary Automatic Polishing and Buffing Machine**

Bulletin No. 45, issued by Hammond Machinery Builders, Inc., Kalamazoo, Mich., includes illustrations, descriptions, and specifications of the Hammond "Super" Rotary Automatic for grinding, polishing, buffing, and deburring.

**14. Cleaning Machinery**

An illustrated folder descriptive of its complete line of machinery for washing, rinsing, and drying metal parts is now being offered by the Cincinnati Cleaning and Finishing Machinery Co., Ironton, Ohio.

**15. Abrasive Belts**

Thirteen production reports from various manufacturers citing advantages of Resinall Metalite Belts are contained in a folder issued by Behr-Manning, Troy, New York.

**16. Vapor Degreasing**

"Vapor Degreasing with Du Pont Non-Flammable Solvents" is a title of a book on practical metal cleaning being issued by E. I. du Pont de Nemours & Co., Inc., Electrochemicals Dept., Wilmington 98, Delaware. Information included in the book concerns the application of vapor degreasing to metal cleaning problems. The book is illustrated with application photographs showing vapor degreasing in various industries.

**17. Phosphate Coating**

The Neilson Chemical Co., Detroit 7, Mich., has issued Prep-N-Cote Bulletin 48-91, describing the application of Prep-N-Cote to the preparation of steel and aluminum for painting.

**18. Paint Film Value**

"3/1000 of an Inch," the title of an eight-page booklet depicting the devastation wrought by the lack of painting and ways to combat it, can be obtained from the National Paint, Varnish and Lacquer Association, Washington, D. C.

**19. Abrasive Grains**

The Exolon Co., Tonawanda, N. Y., has issued a folder describing Exolon abrasive grains and polishing procedures applicable to various industry groups.

**20. Nickel Plating**

"Practical Nickel Plating" is the title of a comprehensive booklet issued by the International Nickel Co., New York 5, N. Y., which contains a summary of information on industrial nickel plating, including solution compositions, operating conditions, process cycles, cause and correction of plating difficulties, and solution purification methods.

**21. Organic Finishing**

A 12-page technical bulletin outlining basic points to be considered in the planning of a complete organic finishing system has been prepared by Peters-Dalton, Inc., Detroit 12, Michigan.

**22. Cleaners and Paint Strippers**

Six technical bulletins describing paint strippers, cleaners, and phosphate coating materials are being distributed by Chemco Products Co., Inc., Chicago 19, Illinois.

**23. A.C. Generators**

A bulletin describing the construction and operation of Columbia alternating current generators is being issued by the Columbia Electric Manufacturing Co., Cleveland 14, Ohio.

**24. Clear Lacquer**

Stanley No. 45X-70 Clear Gloss Synthetic, a water-white coating for silver, or brass, chromium, steel, iron, magnesium, and zinc, is described in a data sheet available from The Stanley Chemical Co., East Berlin, Connecticut.

**25. Abrasive Belt Head**

Bulletin No. 17 issued by The Packer Machine Co., Meriden, Conn., describes Model No. 18 universal abrasive belt head and contains suggested applications of the device.

**26. Tumbling**

"Precision Tumbling with Alundum Abrasives" is the title of a booklet of interest to finishers of metal or plastic parts, which is being offered by the Norton Co., Worcester 6, Massachusetts.

**27. Degreasing Solvent**

Niagara Alkali Co., New York 17, N. Y., has released a six-page folder describing its Nialk Trichlorethylene for rapid, thorough cleaning of all types of metal parts.

**28. Baking and Drying Ovens**

Both batch and conveyor type baking and drying ovens are the subject of Bulletin 5 issued by the Young Brothers Co., Cleveland, Ohio.

**29. Finishing Equipment**

J. Holland & Sons, Inc., Brooklyn, N. Y., has published Folder "M" describing finishing equipment furnished by the company.

**30. Burnishing Materials**

The Abbott Ball Co., Hartford 10, Conn., has prepared data and charts illustrating and describing its line of burnishing materials.

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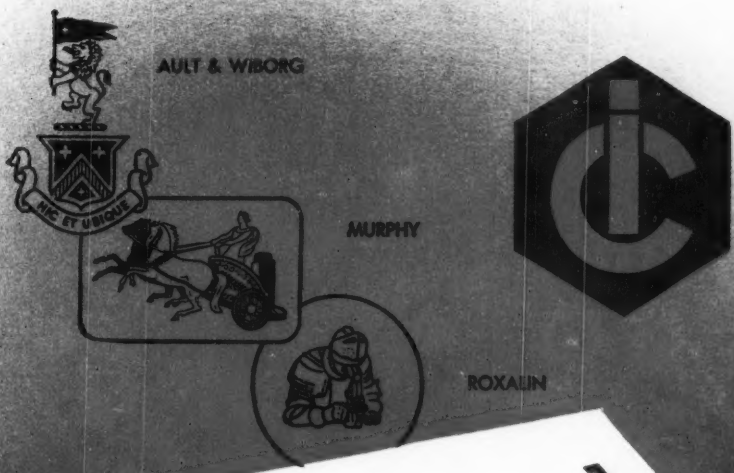


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